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WASHINGTON UNIVERSITY IN ST. LOUIS

Brown School

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Utilization Patterns of Community-based Mental Health Services Among school-going
Adolescent girls in Southwestern Uganda.

By

William Byansi, MSW

A dissertation presented to
The Graduate School
of Washington University in
partial fulfillment of the
requirements for the degree
of Doctor of Philosophy

August 2021
St. Louis, Missouri

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Washington University in St. Louis

August 2021

ABSTRACT OF THE DISSERTATION

Utilization Patterns of Community-based Mental Health Services Among school-going
Adolescent girls in Southwestern Uganda.

By

William Byansi, MSW

Doctor of Philosophy in Social Work

Washington University in St. Louis, 2021

Professor Fred M. Ssewamala, Chair

Globally an estimated 20% of children and adolescents experience a disabling mental illness (Belfer, 2008). Mental health disorders are the second leading cause of disease burden and the eleventh leading cause in older adolescents (15-19 years). Yet, children and adolescents are over-represented in low-resourced countries and settings often characterized by violence, wars, diseases, physical and sexual abuse, all of which are associated with poor mental health functioning (Kieling et al., 2011; Naker, 2005). Moreover, in LMICs the treatment gap is about 93% of individuals without access to mental health services with virtually no coverage of evidence-based interventions (Chisholm et al., 2016). Yet, psychosocial interventions are the most studied and effective treatments available (Singla et al., 2017; Patel et al., 2018).

In addition, even within this group of children and adolescents, gender seems to be a critical factor that influences the utilization of mental health services. Girls more than their male counterparts are more likely to report mental health challenges (Nolen-Hoeksema, 2002; Petroni et al., 2015). This stems from gender-related inequalities, including physical and emotional abuse, poverty, social isolation, and educational disadvantage, which increase their vulnerability to depression and stress (Kågesten et al., 2016; Reiss, 2013; Rhodes et al., 2014). Taken as a

whole, untreated mental illnesses have significant social, economic, and political disruptions to individuals, families, communities, and nations. This is because untreated mental disorders significantly impact a child's growth, educational achievement, and ability to live a happy and healthy life. Therefore, promoting evidence-based psychosocial interventions is a promising approach to increase access to mental health services among adolescents in low-resource settings.

This dissertation project aimed to improve understanding of patterns of mental health service utilization among 1260 adolescent girls from 47 public secondary schools in a low-resource country, Uganda, as well as examining the Andersen model's constructs associated with mental health utilization by addressing gaps in the literature. It had four specific aims including, 1) to explore the short-term impact of an evidence-based MH intervention on depressive symptoms among 1260 school-going adolescent girls in southern Uganda; 2) to document the prevalence of depressive symptom severity and describe their characteristics among a sub-sample of school-going adolescent girls in southern Uganda participating in a community based mental health intervention; 3) to describe the patterns of mental health service utilization and explore how predisposing, enabling, and need factors are associated with mental health service utilization among school-going adolescent girls in southern Uganda participating in a community based mental health intervention; and 4) to explore pathways between predisposing, enabling, and need factors and how the pathways vary by patterns of mental health service utilization.

Data from two waves, 2017-2018 of the Suubi4her study were used. Suubi4Her is a three-arm cluster randomized-controlled trial design (Youth Development Accounts (YDA) only, YDA + Multiple Family Group (MFG), Usual Care) in 47 secondary schools in the southwestern region of Uganda. The sample consisted of 1,260 adolescent girls (ages 14–17 at enrollment)

enrolled in the first two classes (senior one and senior two). I used descriptive statistics to document depressive symptom severity and describe their characteristics. At baseline, the results showed that about 41% of adolescent girls evidenced mild to severe symptoms. Similarly, the findings indicated that at 12-months post-intervention initiation, participants had a significant decline in depressive symptoms compared to the baseline ($M=18$ vs $M=13$, $P<.001$). A three-level mixed-effects model was conducted to examine the effect of an evidence-based intervention on depressive symptoms. The results indicate that at 12-months post-intervention initiation, the intervention was effective in reducing depressive symptoms between the treatment and control conditions. Furthermore, the results revealed that exposure to violence, low levels of asset ownership, and low quality of social support relationships were risk factors for depressive symptoms.

To identify the heterogeneity of mental health utilization, Latent Class Analysis (LCA) was utilized. Logistic regression analysis was conducted to assess the association between predisposing, enabling, need factors and patterns of mental health utilization. Using LCA, two groups were identified: low attendants and high attendants. In addition, two family-level factors, number of adults and number of children in the family, were associated with an increase in utilization of mental health services. A structural equation model (SEM) was utilized to investigate the relationship across mental health utilization patterns from predisposing to need factors through enabling factors. The SEM found that enabling and predisposing factors were directly associated with need factors. The study also found that the quality of social support relationships mediated the relationship between exposure to violence and depressive symptoms. This relationship was different for participants in the low attendants' group compared to

participants in the high attendants' group, indicating the potential effect of the intervention in enhancing social support among intervention participants.

Findings suggest that mental health utilization is heterogeneous among adolescent girls and that enhancing family support systems is critical to promote mental health utilization among adolescent girls. In addition, results also imply that an evidence-based psychosocial intervention may be a promising tool in addressing depressive symptoms among adolescents. Additionally, results suggest that enhancing intervention factors such as social support that buffer against violence and enhance social connectedness could be useful to alleviate depressive symptoms. Therefore, in addition to material support, strategies to improve the support and care for adolescents, especially in low-resource settings, should focus on strengthening family support systems to enhance adolescents' psychological well-being.

Chapter 1: Introduction

1.1 Background and significance

Globally, child and adolescent mental health (CAMH) contributes significantly to the burden of diseases (WHO, 2013). Global estimates indicate that 20% of children and adolescents experience a disabling mental illness (Belfer, 2008). The WHO world Atlas project of CAMH indicates that among young adolescents (10-14 years), behavioral disorders are the second leading cause of disease burden and the eleventh leading cause in older adolescents (15-19 years). In addition, suicide is the third leading cause of death among youth; and psychiatric conditions are responsible for 16% of the global burden of illness and injury among adolescents (10-19 years) globally (WHO, 2020). Indeed, most adulthood disorders begin in adolescence; with half of all lifetime mental illnesses emerging by age 14 (Kessler et al., 2005). In their seminal study utilizing a nationally representative sample among adults in the United States (n=9282), Kessler and colleagues (2005) found that mental health disorders begin during adolescence. Specifically, anxiety symptoms begin around 6 years of age, symptoms of behavior disorders begin to emerge by 11 years of age, mood disorders begin to emerge by 13 years, and substance use disorders begin to emerge by age 15 years (Kessler et al., 2005). Taken as a whole, untreated mental illnesses have significant social, economic, and political disruptions to individuals, families, communities, and nations. This is because untreated mental disorders have a significant impact on a child's growth, educational achievement, and ability to live a happy and healthy life.

Globally, there are an estimated 1.2 billion adolescents (10-19 years) accounting for 16% of the world's total population, of which 90% live in Low and Middle-Income Countries (LMIC), particularly in Asia and Africa (UNICEF, 2019). Hitherto, CAMH has often been

ignored in public health programs and research because it encompasses a developmental stage, adolescence, considered the healthiest time in one's life. Yet, about 10-20% of children and adolescents globally experience a mental health disorder (Kieling et al., 2011). Children and Adolescents in Low and Middle-Income Countries (LMICs) experience daily difficulties resulting from loss of parents, poverty, unemployment, and physical and sexual victimization, all of which exacerbate poor mental health (Patel et al., 2008; Patel & Kleinman, 2003b). In addition, children and adolescents—as a group—are over-represented in low-resourced countries and settings often characterized by violence, wars, diseases, physical and sexual abuse, all of which are associated with poor mental health functioning (Kieling et al., 2011; Koenig et al., 2003; Naker, 2005; Patel & Kleinman, 2003a). To illustrate, sub-Saharan Africa, one of the poorest and low-resourced regions on earth—and focus for this proposal—has over 23% of its population dominated by children and adolescents (10-19 years), most of whom are disproportionately affected by poverty, poor mental health, and substance use disorders (UNICEF, 2019). Evidence indicates that neuropsychiatric disorders are a leading cause of health-related burden, accounting for 15-30% of disability-adjusted life-years (DALYS) lost in the first 30 years of life (Lopez & Disease Control Priorities Project., 2006; Lopez et al., 2006). In addition, mental and neurological disorders are associated with a huge cost on health care systems, loss of worker productivity, the burden on caregiving families, functioning impairment, and often lead to gross human rights violations (Hu, 2004; Tsang et al., 2003). In a systematic review of adolescent mental health in non-referred samples in LMICs, Patel and colleagues (Patel et al., 2018) reported a prevalence of about 10-20% (range 1.81%-39.4%) from 16 surveys. This is attributed to the use of several methodological approaches, diversity in the protective and risk factors, as well as the diversity of cultures.

1.1.2 The mental health treatment gap

Low and Middle-Income Countries (LMICs) are at different stages in the journey of awareness of the burden of mental illnesses, acceptance by society and policymakers, and allocation of resources for the development of mental health services. Thus, there is wide variability in the provision of mental health care between countries. There is currently a large worldwide gap between the burden of mental illness and access to and utilization of mental health care services, particularly in Low and Middle-Income Countries (LMICs) (Grelotti et al., 2015).

In LMICs, the majority of the people experiencing mental health disorders do not have access to care. In LMICs, research indicates that treatment for common mental disorders is between 7% and 28% (Chisholm et al. 2016). Moreover, in LMICs the treatment gap is about 93% of individuals without access to mental health services with virtually no coverage of evidence-based interventions—defined as practices or programs that have peer-reviewed, documented empirical evidence of effectiveness (Chisholm et al. 2016). Yet, psychosocial interventions are the most studied and effective treatments available (Singla et al., 2017; Collier & Valentin, 2018; Grelotti et al., 2015; Patel et al., 2018). The WHO (2020) recommends psychosocial interventions as the first line of treatment for most people who otherwise cannot access pharmacological treatments. Untreated mental illness among such large segments of the population in LMICs has detrimental economic, political, and social impacts in these countries.

The limited coverage of psychosocial interventions in LMICs is due to several factors. These include a reliance on a small number of practitioners to deliver or supervise services, as well as to educate therapists (Kohrt et al. 2015), the use of overly specialized disorder-based

treatment packages (England et al. 2015; Kazdin, 2016) and the stigma associated with help-seeking for mental illnesses (Semrau et al 2015).

Most countries struggle with the high need for mental health services and the persistent limited financial resources, workforce, and infrastructure for mental health services. In LMICs, there are severe shortages of mental health professionals including psychiatrists, social workers, psychologists, psychiatric nurses (Saxena et al., 2007; Ssebunnya et al., 2010), which make the orthodox model of mental health care that relies on professional providers impossible. The proportions of people with a mental disorder who receive treatment are low with an international survey reporting that the proportion of people with mental illnesses that had not utilized any mental health services in the previous 12 months ranged from 1.6% in Nigeria to 17.9% in the United States (Patel et al., 2018). The proportions of people with mental illness who receive evidence-based treatments are likely to be even lower. The statistics for adolescents, let alone adolescent girls, are non-existent in SSA and Uganda in particular. This is because most young people experiencing mental illnesses are either not diagnosed or do not have access to mental health services. This is due to the scarcity of a professional workforce (Kakuma et al., 2011), and limited or non-existent mental health infrastructure in most LMICs (Kakuma et al., 2011). For instance, the consequences of maintaining mental health as a low priority with low budgets result in significantly fewer professionals, including psychiatrists, psychologists, psychiatric nurses, and social workers. While in low-income countries the median number of psychiatrists per 100,000 is <1 this number increases slowly as countries gain income, to 2.03 in upper-middle-income countries, and 8.59 in high-income countries (Kohrt & Mendenhall, 2016). Indeed, previous research has shown a huge service gap for adolescent mental health services in LMICS (Saxena et al., 2007).

In addition, studies have extensively documented barriers to access and utilization including physical or geographical barriers, socioeconomic status (Patel et al., 2003), limited mental health policies and plans (Saxena et al., 2007), and stigma and discrimination (Thornicroft, 2006). In addition, gender is also an important predictor of mental disorders, help-seeking, and the need for services (Oliver et al., 2005). In many settings, more women than men are more likely to be diagnosed with a mental disorder and receive care. Therefore, the treatment gap in LMICs is widened by the persistent presence of both individual and structural barriers to mental health care.

Despite the widespread recognition of the importance of mental health promotion and prevention in children and adolescents, the gap between CAMH needs and available services is huge. Thus, the failure to address CAMH needs in LMICs constitutes a consequential public health concern because such failure exacerbates societal costs and hinders the basic development goals. Moreover, given that the majority of mental health problems in adults begin during the early years of life (Belfer, 2008; Kessler et al., 2007), with the potential for long-lasting effects beyond childhood and adolescence, there is a need to pay attention and to address mental health problems in children and adolescents from a very early age. Such should be a priority for the global health agenda. Besides the arguments of how societal costs can be reduced by early intervention, it is a moral and ethical responsibility to serve the most vulnerable young people, whose full developmental potential can be foiled. Thus, there is a need to strengthen initiative and awareness of CAMH globally but more specifically for LMICs.

1.1.3 Gender and mental wellbeing.

Moreover, even within this group of children and adolescents, gender seems to be a critical factor that influences the utilization of mental health services. Girls more than their male

counterparts are more likely to report mental health challenges (Nolen-Hoeksema, 2002; Petroni et al., 2015). For example, studies have documented that female adolescents are more likely to exhibit severe emotional and behavioral distress compared to adolescent boys; and several studies have documented the disproportionate prevalence of depression and other mental health disorders among females compared to males (Nolen-Hoeksema, 2002; Petroni et al., 2015; Schraedley et al., 1999; World Health, 2019). In SSA, compared to boys, adolescent girls and young women are three times more likely to have depressive disorders and to attempt self-harm (Ssewamala et al., 2009). Similarly, Rescorla and colleagues examined mental health symptoms by gender across 31 societies (n=55,508) including countries in both the developed and developing world (Rescorla et al., 2007). The study found that compared to males, female adolescents reported higher levels of overall emotional distress and more depressive symptoms. Male adolescents on the other hand were more likely to report externalizing problems including conduct and oppositional defiant disorders. Other studies have documented that female orphans exhibit higher levels of psychological distress, social isolation, loss of education, and risky behaviors compared to boys (Lata & Verma, 2013; Nabunya & Ssewamala, 2014; Schraedley et al., 1999).

Few services and initiatives have addressed adolescents' mental health needs effectively and even fewer have considered/addressed the existing gender gaps and disparities in CAMH (Kapungu & Petroni, 2017; Kågesten et al., 2016). Yet, gender is a critical determinant of mental health and psychological wellbeing. Gender exerts unequal power and influence over the social-economic resources between men and women, which are determinants of mental health, social role, status, and care in society. In many patriarchal societies, men have control over resources and the means of production (WHO, 2014)—hence, increasing the vulnerability and exposure to

risks to mental health among women. As Patton and colleagues point out in their 2016 Lancet Commissioned Report on Adolescent Health, during adolescence, mental illnesses frequently occur, affected by both the biological, emotional, and cognitive mechanisms associated with puberty and social environments as adolescents transition through this substantial period of life (Patton et al., 2016). Indeed, the current literature indicates complex and substantial connections between the development process of adolescents, gender norms, and mental health wellbeing.

Evidence across several countries suggests that gender-related inequalities, including physical and emotional abuse, poverty, social isolation, and educational disadvantage, can all increase vulnerability to depression and stress (Kågesten et al., 2016; Landstedt et al., 2009; Reiss, 2013; Rhodes et al., 2014). Girls are at a higher risk than boys for any of the gender inequalities in most countries including abuse, violence, and bullying. Worse still, adolescent girls in humanitarian settings face elevated risks including sexual abuse, forced labor, and gender-based violence, all of which negatively impact their mental wellbeing (Stark et al., 2020). In sum, while gender disparities affect boys' and girls' lives, existing evidence indicates that adolescent girls are disproportionately disadvantaged compared to their male counterparts.

Economic inequality, gender-based violence, early and forced marriage, sexual abuse and exploitation, exclusion from schooling, jobs and decision making, and unequal household and caregiving burdens are gender-specific risk factors (Kapungu & Petroni, 2017; Meyer et al., 2020; Seff et al., 2020; Viner et al., 2012). Social gendered norms also affect the vulnerability of exposure of adolescent girls and boys to various health hazards, as well as the quest for, access to, and use of mental health treatment (Kapungu & Petroni, 2017). A higher prevalence of mental illnesses is linked to frequent exposure to gender-based violence. In the same way, depression and anxiety disorders are often closely associated with sexual abuse at any age, and women who

have encountered sexual assault are more likely than other women to attempt suicide either in childhood or as adults.

Social norms and expectations heavily influence gender and sexuality. During puberty, gender role differentiation and discrimination increase during this crucial growth period (Petroni et al., 2015). Rigid gender roles can affect both girls and boys deeply and adversely and in particular, can constrain the ambitions and opportunities of adolescent girls (Petroni et al., 2015). For instance, they may affect girls to travel or to attend school, where to and not to go, and the kinds of social activities they are allowed to participate in. Adolescent boys, on the other hand, are more capable of traveling openly and thus have greater opportunities to engage in community and access employment opportunities than girls (Lundgren et al., 2013).

In studies on depression, for example, gender intensification defined as the increased demand for adolescents to adhere to culturally sanctioned gender roles has been posited as an important explanatory factor (Hill & Lynch, 1983). Such intense pressure comes from parents, peers, educators, and the media. While gender socialization begins at birth, early adolescence (age 10-14) is a crucial stage as social expectations and gender roles intensify from family members. For instance, a systematic mixed-methods analysis among young adolescents found that they generally support norms that perpetuate gender inequality in several settings and that such attitudes are shaped by parents and peers (Kågesten et al., 2016).

Girls, for instance, are more likely than boys to experience forced sexual initiation, to drop out of school, and being married as children, exposing them to greater health dangers, including early pregnancies, greater maternal and infant mortality, and vulnerability to HIV and other sexually transmitted infections (Kapungu & Petroni, 2017; Stark et al., 2020). Girls who marry before 18 years face decreased educational and paying work prospects, decreased

economic and health decision-making capacities, and increased risk of intimate partner violence (Kapungu & Petroni, 2017; Viner et al., 2012). These risk factors are coupled with puberty-related biological, emotional, and cognitive processes (Albert, 2015; Patton et al., 2016), further raising the risk of depression and other mental health disorders among adolescent girls.

Neuroscience and social science research indicate that the experience of pervasive discrimination based on gender may contribute significantly to poor mental health, depression, and suicide and that further research is warranted (Petroni et al., 2015).

Therefore, restrictive social norms and discrimination based on gender limit the perceived power that girls have over their own lives and futures and that this perceived lack of control may have negative effects on their mental health and wellbeing. Evidence suggesting the effect of gender norms and prejudice on girls' mental health can elucidate policies and programs that promote their overall wellbeing.

Taken as a whole, age (child and adolescence stage), location (residing in LMIC) and gender (being a girl) seem to impact MH functioning in a very significant way, as well as access and utilization of mental health services. Yet, the bedrock of much global mental health has focused on early detection and intervention through embedding mental health care into primary health care settings for the adult population, with limited focus on children and adolescents. Moreover, the current approach to addressing poor mental health functioning seems to ignore the gendered nature of poor mental health functioning—not paying much attention to the diverse vulnerabilities including violence, abuse, neglect, lack of educational opportunities, and poverty that severely impact adolescent girls' use of mental health services.

Increasingly, mental health care practitioners and researchers recognize the need to address the existing gender gap in access and utilization of mental health care among adolescents

(Kågesten et al., 2016; Singla et al., 2017), while recognizing that the dissemination and implementation of empirically supported psychological treatments in any setting can be challenging (Kazdin 2016). This is critical because adversities in childhood and adolescence can have negative lifelong impacts on health and mental health as well as limit adolescent girls' participation in education, economic opportunities, and society as a whole (Hu, 2004; Tsang et al., 2003). Therefore, mental health researchers and practitioners have created novel ways to overcome some of the challenges to adoption and adaptation to eliminate mental health inequalities among adolescents especially adolescent girls. These include aligning treatment material with prevalent disease beliefs, providing treatment in less stigmatizing and accessible environments, such as health care and community settings, and using lay professionals to support mental health professionals (van Ginneken et al. 2013). These approaches have been linked to moderate to significant impacts on health and mental health wellbeing among people with common mental disorders (Clarke et al. 2013, van Ginneken et al. 2013).

As such, this dissertation adds to this important scientific inquiry of child and adolescent mental health service utilization. First, adolescent girls in this study participated in an evidence-based intervention referred to as the multiple family group. This is critically important because, in recent years, global mental health has adopted a transdiagnostic approach to address mental health challenges in low-resource settings (Bolton et al. 2014; Murray et al. 2014). This approach posits that using a set of varying treatment approaches can simultaneously address several mental health challenges (Chorpita & Daleiden 2009). For instance, an intervention developed to address behavioral difficulties among children can be tailored to address both behavioral challenges and depressive symptoms. Such an approach is likely to enhance implementation strategies necessary for implementation and ultimately scale-up of psychological interventions.

Specifically, the current study proposes to utilize the Andersen model of mental health utilization among adolescent girls residing in poor/low-resourced communities in Sub-Saharan Africa. In addition to diversifying the theory application to the SSA region and applying it to a new cultural context, the study will examine pathways of the theory's constructs concerning gender and mental health utilization. Empirical evidence from this study is critical for developing comprehensive interventions designed to address barriers to child and adolescent mental health utilization, especially among girls residing in low-resourced communities. Moreover, there is limited application of the Andersen behavioral model within the SSA region (Roberts et al., 2018). Therefore, evaluation of the model will provide groundbreaking knowledge to improve health outcomes for adolescent girls in Uganda and the SSA region.

In addition, this line of inquiry will help to examine the patterns of mental health service utilization among adolescent girls participating in a multiple family group (MFG) intervention and its effectiveness, which will determine key predictors associated with mental health utilization. This is critical because given the scarcity of resources in many SSA countries, understanding the level at which adolescents get the best use of the services provided is critical for developing interventions that can increase mental health service utilization. In the same way, it is important to establish effective culturally relevant interventions that can alleviate psychological distress among vulnerable adolescents in SSA.

Furthermore, the current study will examine a theoretically hypothesized mediation model elucidating the relationship association between predisposing and need factors through social support. This is important for several reasons. First, for many adolescents in low-resource settings like in SSA, understanding the connection between social support and depression is critical for designing strategies that effectively reduce depression in SSA adolescents. Secondly,

enhancing adolescents' psychological well-being requires strengthening family support systems that support and care for adolescents.

Thus, the overall goal of the proposed study is to examine mental health service utilization among adolescent girls in Uganda as well as examining constructs from Andersen's model of health service utilization, described below, associated with mental health utilization. This was addressed via four specific aims described below.

1.2 Research aims, questions, and hypotheses

This subsection includes the research questions and hypotheses that guide this dissertation. The questions are guided by the Andersen behavioral model of health care utilization—further described in chapter two (Andersen & Aday, 1978; Andersen, 1995). Therefore, to address the study's overall goal, which is, to examine patterns of mental health service utilization among adolescent girls in Uganda as well as examining the Andersen model's constructs associated with mental health utilization, the Andersen behavioral model was utilized. The model has been widely applied in understanding health utilization in general among adult populations particularly in the developed world with limited application in low resource settings including SSA (Andersen, 1995; Babitsch et al., 2012). The model posits that health care utilization is influenced by three interrelated constructs including predisposing, enabling, and need factors (Andersen, 1995). These key constructs have been expounded on in the second chapter and guided the conceptualization of this dissertation.

Therefore, to achieve the study's aims, the following research questions were addressed.

Study Aim 1: To explore the short-term impact of an evidence based MH intervention on depressive symptoms among 1260 school-going adolescent girls in southern Uganda.

Research question 1: *What is the short-term impact of an evidence based MH intervention on depressive symptoms among adolescent girls?*

Despite mounting evidence demonstrating the effectiveness of psychological interventions in the global setting, there is a huge mental health treatment gap estimated to be about 93% in low-resource settings (Singla et al., 2017). Additionally, there is still limited evaluation of effective interventions for adolescent girls in resource-constrained settings. Therefore, evaluating the effectiveness of evidence based psychological interventions is essential for scaling up interventions, not only in LMICs but also in HICs, which are struggling to close the huge mental health treatment gaps among adolescents. This exploratory aim therefore examines the short-term impact of an evidence based mental health intervention, hereafter multiple family group intervention, on depressive symptoms among 1260 school-going adolescent girls who participated in a multiple family group intervention. Thus, this is an exploratory aim and hence no assumptions were made.

Study Aim 2: To document the prevalence of depressive symptom severity and describe their characteristics among 317 school-going adolescent girls in southern Uganda.

Research question 2: *What is the prevalence of depressive symptom severity and how do these differ by predisposing, enabling, and need factors among adolescent girls?*

H2: Research indicates that depressive symptoms are more pronounced during the life transitions of adolescent girls (for example educational level transitions). I examine depressive symptoms across two-time points; offering the following hypothesis: *As adolescent girls transition from one educational level to another, their depression levels will likely increase.*

Study Aim 3: To describe the patterns of mental health service utilization and explore how predisposing, enabling, and need factors are associated with mental health service utilization among school-going adolescent girls in southern Uganda.

Research question 3. *What are the patterns of mental health service utilization and how are they associated with predisposing, enabling, and need factors of mental health service utilization?*

H3a: *There will be distinct patterns of mental health service utilization among school-going adolescent girls.*

H3b: *Predisposing factors (age, education level, religion, family size, number of children in the family, and residence) will be associated with a lower likelihood of mental health service utilization among school-going adolescent girls.*

H3c: *enabling factors (family assets, self-reported health, quality of social support relationships, and distance to the school) will be associated with a high likelihood of mental health service utilization among school-going adolescent girls.*

H3d: *Need factors (depressive symptoms,) will be associated with a high likelihood of MH service utilization among school-going adolescent girls.*

Study Aim 4: To explore pathways between predisposing, enabling, and need factors and how the pathways vary by mental health service utilization.

Research Question 4. *What are the direct and indirect pathways between predisposing (Age, residence, number of adults, and exposure to violence), and need factors (depressive symptoms)? Does this relationship differ by attendance patterns?*

H4a: *There is a direct relationship between Predisposing factors (Age, residence, number of adults, and exposure to violence) and need factors (depressive symptoms).*

H4b: *There is an indirect relationship between predisposing (Age, residence, number of adults, and exposure to violence) and needs factors (depressive symptoms), through enabling factors (quality of social support relationships).*

H4c: *The hypothesized indirect effect in H4b will vary by patterns of mental health utilization.*

Chapter 2: Theoretical framework

This section examines the theoretical framework used to understand the contribution of the individual, social contextual, systemic, and structural factors associated with the utilization of mental health services among adolescents in Sub Saharan Africa. The theory guiding the current dissertation is grounded in social-ecological epistemologies, which acknowledge that health outcomes and health behaviors are (1) subjected to multiple levels of influence, (2) affected by the social environment, and (3) a product of the interactions between person and environment (Glanz et al., 2008). The theory discussed below addresses individual and contextual levels of influence that interact to affect the use of mental health services among adolescents.

Additionally, the theory purports to address either or both barriers and facilitators (individual and environmental facilitators/barriers) to the use of mental health services among adolescents in SSA. The current dissertation is guided by the Andersen model of healthcare utilization. Like many other theories, it should be noted, however, that this theory has not been widely used in most SSA literature. Therefore, this chapter relies on literature from other settings, especially in the developed world. This is also important because this work extends the use of this theory in SSA and examining the core concepts and applicability in low-resource settings.

2.1 Andersen's behavioral model of health care utilization

The model was originally developed by a medical sociologist to evaluate access to health services in 1968. The model has been widely used in the literature of mental health use and access in the developed world (Andersen, 1995). The model attempts to explain and predict mental health service use using constructs that examine both the individual and contextual determinants of health service use. In the original model, population/individual-level

characteristics involved three different but interrelated constructs predicting access and utilization: predisposing, enabling, and need (Andersen, 1995). On the other hand, the contextual/healthcare level system included policy, resources, and the organization. In addition, these two levels do not only predict the use of services—for example, type, site, purpose, and time interval but also predict customer satisfaction with the services and hence facilitate access to health services.

Furthermore, the predisposing factors in the model relate to demographic characteristics including age, gender, and religion. It also encompasses social factors such as education, occupation, ethnicity, and social relationships (family status). Similarly, it includes mental factors such as health beliefs (attitudes, values, and knowledge) related to health and health services. On the other hand, contextual factors predisposing individuals to the use of health services include the demographic and social composition of the community, cultural norms, and political perspectives. In addition, enabling factors include both financial and organizational factors that enhance the utilization of health services. These span the individual (income, insurance, and cost of healthcare) and the contextual factors such as insurance coverage, wealth, the relative price of goods and services, healthcare expenditures, and ways of compensating providers. Thus, organization broadly encompasses access and availability of health structures, medical/health personnel, location of health facilities, office hours, distribution/density of hospitals/staff, and outreach and educational programs, all of which synergistically facilitate access and use of mental health services.

The model has evolved to further delineate between the perceived need for health care services and evaluated need. The former relates to the individual expression of health vs. professional and objective assessment of health and illness symptoms and the latter focuses on

the impact of the environment on health (pollution, crime, and traffic) and the population level health indicators such as mortality, morbidity, and disability.

The behavioral model has been utilized in the study of healthcare access and utilization (Babitsch et al., 2012). For example, the behavioral model constructs have been used to explain barriers and facilitators of health care access and utilization in both developed and developing countries (Gulliver et al., 2010). Studies suggest that predisposing and enabling factors can facilitate and impede access and use of mental health care services (Babitsch et al., 2012). Indeed, both contextual and individual-level factors must be present and reinforcing for mental health service use to take place. Although the model has been critiqued for overemphasizing need as the most important predictor of healthcare use, it also emphasizes the broader contextual issues like provision of healthcare (both private and public). It is worth noting that modeling healthcare use and access is dependent on people's view of their health and functionality. It takes into account the individuals' experience of illness and symptoms as well as determination to seek professional help/services. Undoubtedly, this is not the only predictor of access. Indeed, enabling resources are critical to the access and use of healthcare services. One great strength of the model is its flexibility and robust analytical framework that provides ease of discussion. Similarly, the variables are testable and transcend age groups and geographical boundaries (Babitsch et al., 2012). For instance, the study by Weller and colleagues showed that enabling factors influenced the use of services, especially among participants with public insurance (Weller et al., 2003). The study of Rivara and colleagues showed that need factors measured by the experience of Intimate partner violence influenced the use of health services (Rivara et al., 2007). In addition, Diehr and Evashwick used the model to examine utilization among elderly people. Their study showed that need factors were important predictors of the use of physician services, hospitalizations,

ambulatory care, and home care while predisposing factors were better predictors of the use of dental services (Evashwick et al., 1984). However, advances in science, for instance around genetic research, make the theory lacking in its applicability to predict some patterns of use.

For example, should the genetic predisposition to specific mental illnesses be considered among predisposing factors? In other words, there are aspects of scientific advancement that are not captured in the original conceptualization and might require research to be included in the model. Additionally, Azfredrick (Azfredrick, 2016) examined health services use by adolescent girls in southeastern Nigeria using Anderson's model of health service utilization. Using multistage sampling, 3065 adolescent girls were recruited from 33 secondary schools. The average age of participants was 14.77 (SD=4.5) years. The study found that age (OR = .78, 95% CI: .64, .95), type of healthcare facility (OR = 2.0, 95% CI: 1.7, 2.3), and feelings of inadequacy (OR = 1.8, 95% CI: 1.4, 2.4) were associated with health care utilization. Therefore, future applications of the model to healthcare services research should involve testing specific measures relating to a particular condition or type of service or practitioner and should be linked to an episode of illness.

Effective use of theory in research focusing on access and use of mental health services among adolescents is critical to further strengthen the theoretical base in LMICs. Primarily, the main focus of theories and research concerning access and utilization of mental health services among adolescents has been on the individual. At the higher level, there has been a focus on the interpersonal and intrapersonal factors that influence the individual. Overall, the model described above has provided relevant and useful constructs for exploring access and utilization of mental health services among adolescents in both LMICs and Sub-Saharan Africa in particular. The theory remains applicable and widely used in mental health services research examining specific

individual predictors (e.g. predisposing, enabling, and need factors) and/or system-level predictors (e.g. community-level resources). As earlier noted in access, research, facilitators, and impediments are not simple, isolated, or static. Rather multifaceted issues that can be addressed at the individual, family, and community levels.

Theory examining mental health access and utilization among adolescents in Sub-Saharan Africa should explore the multiplicity of diversity among adolescents. This includes the diverse culture, beliefs, religion and languages. The theory's constructs should be able to examine pathways of access and use across adolescent lifespans, and between cultures and countries. The behavioral model does not make the use and application of diversity explicit in its approaches.

A final yet critical element of theory in research exploring concepts of mental health care access and use among adolescents is the use of culturally sensitive and relevant constructs that can be validated using psychometrics and/or constructs that carefully reflect the contemporary experiences of adolescents in SSA. In other words, conceptualization and theoretical concepts should be accessible, applicable, and adaptable to effectively inform studies and interventions that target a diverse array of adolescents in SSA.

Chapter 3: Literature review

Empirical literature examining mental health service utilization among adolescents in low resource settings is limited. In this review, the empirical literature is organized into three categories of adolescent mental health in low resource settings: (1) epidemiology of mental health, (2) key concepts associated with mental health utilization, and (3) barriers and factors that influence adolescent mental health service utilization.

3.1 Current situation of adolescent mental health in Sub-Saharan Africa

The assessment of the mental health needs of adolescents is complex, encompassing epidemiological data gathering, comparisons of data from different areas, and input from people and agencies engaged in the care of adolescents (Rahman et al., 2000). Understanding the prevalence of mental health problems is critical to determine the magnitude of the problem, as well as the identification of positive and negative factors affecting mental health. It can further inform early interventions that can reduce the burden of these disorders. There are noticeable variations in the prevalence rates of mental health disorders across geographical and age-specific contexts. This can be attributed to the use of various methodological approaches and potentially to the various risks and protective factors and the culture in which mental health problems occur (Canino & Alegria, 2008). Given that such data is not readily available in all contexts of LMICs, studies in this review are substantiated with data for adult mental health.

Children in most of Africa and particularly Sub-Saharan Africa (SSA) comprise half of the total regional population, yet current mental health services are severely under-equipped to meet their needs (Kieling et al., 2011; Roberts et al., 2014). A recent systematic review estimated that 1 in 5 children in SSA struggle with a mental health issue, with a range of general prevalence from 2.7% to 25% across studies (Cortina et al., 2012). For instance, in South Africa,

Kleintjes and colleagues formed an expert working group and conducted a systematic review of the most prevalent DSM-V disorders among adults and adolescents (Kleintjes et al., 2006). The study identified a general prevalence rate of mental disorders of 17% among children and adolescents, with a high prevalence documented for anxiety disorder (11%), post-traumatic disorder, and depressive disorders (both 8%).

Similarly, using parent reports from 846 parents in Nigeria, Adelekan and colleagues (1999) found that 18% of the participants met diagnostic criteria for a mental health disorder. In addition, 7.3% met a diagnosis for neurotic disorders, 8% for antisocial disorders, and 3.3% for undifferentiated disorders. Importantly, parents commonly identified headaches, vomiting, distraction, disobedience, fearfulness, and temper tantrums as the commonly reported symptoms. Using a contextually validated measure of Amharic diagnostic instrument in Ethiopia, Ashenafi and colleagues (2001) interviewed 1477 children aged 5-15 years (Ashenafi et al., 2001). The participants were selected from nine villages randomly selected from Butajira town, which was part of the Butajira Rural Health project. Using systematic sampling techniques, 120 participants were selected from 60 households to participate in the study. Their results indicate that 3.5% (n=52) of the respondents reported at least one or more mental health disorders. Furthermore, the most reported disorders were anxiety (1.6%, n=24), disruptive behavioral disorders (1.5%, n=22), and mood disorders (1%). Consistent with the above, a study among Kenyan children and adolescents reported high prevalence rates for depression and anxiety (Ndetei et al., 2008). Specifically, among a randomly selected sample (n=3775), 43.7% of all students evidenced depressive symptoms and 12.9% met a diagnosis for anxiety.

Although there are no specific geographical differences between areas in Sub-Saharan Africa, research from various countries points to a different picture. For instance, in Uganda,

children make up about half (56%) of the total population (UNICEF, 2015), and they present with multiple simultaneous physical, mental health, and educational challenges (UNICEF, 2015). For example, in a cross-sectional study among 519 secondary school students in Mukono district, Uganda, the study found that one in five Ugandan adolescents evidenced a serious mental health challenge. Furthermore, the study found that 21% of adolescents screened positive for depression on the Child Depression Inventory (Nalugya, 2004). In addition to high risk for orphanhood, Ugandan children and adolescents live in disadvantaged communities with high rates of chronic poverty (38%), domestic violence (30%), physical violence toward children (80%), depression (33 to 39%), malaria (70 to 80%), and HIV or AIDS (6%) (Belfer, 2008; Brownstein et al., 2005; Ovuga et al., 2005)).

In a recent study, Kivumbi and colleagues assessed the prevalence of disruptive behavioral disorders among school-going children in the greater Masaka region of Uganda using baseline data from the SMART Africa study (Kivumbi et al., 2019). The study is part of a National Institute of Mental Health (NIMH) funded longitudinal study intended to scale up mental health services to children in Uganda using the multiple family groups (MFG) intervention. Of the 2434 participants from 30 public primary schools, the study found that about 6% and 2% evidenced symptoms of oppositional defiant disorder (ODD) and Conduct Disorder (CD) respectively. Additionally, 2.67% reported elevated symptoms of attention deficit hyperactivity disorder (ADHD).

Consistently, recent estimates from a specialized children's clinic at Mulago National Referral Hospital in Uganda also found that 11% of the participants had attention deficit hyperactive disorder (ADHD) symptoms and 8.57% evidenced conduct disorders (Wamulugwa et al., 2017). In a related study, Mpango and colleagues unraveled a prevalence rate for ADHD

of 6% (n=81) among children and adolescents with HIV/AIDS in specialized HIV/AIDS clinics in central and southwestern Uganda (Mpango et al., 2017). This study used a quantitative design that involved a random sample of 1339 children and adolescents with HIV and their caregivers.

In addition, several factors in the study were associated with ADHD, including socio-demographic (age, gender, and socio-economic status); caregiver (caregiver psychological distress and, marginally, caregiver educational attainment); child's psychosocial environment (quality of child-caregiver relationship, history of physical abuse and, marginally, orphanhood); and HIV illness parameters (marginally, CD4 counts). ADHD was associated with poor academic performance, school disciplinary problems, and early onset of sexual intercourse (Mpango et al., 2017). Since both studies were conducted in a clinical setting, they are likely to provide high prevalence levels for behavioral problems—given that, this would be a self-selected population.

However, similar rates have been documented in other parts of SSA. For instance, estimates indicate prevalence rates of DBDs ranging from 12 to 33% (Ashenafi et al., 2001; Cortina et al., 2012; Liang et al., 2002). Specifically, Ashenaf and colleagues (Ashenafi et al., 2001) interviewed 1477 children using the Amharic version of the Diagnostic Instrument for Children and Adolescents (DICA) to estimate Attention Deficit Hyperactivity Disorder (ADHD), Disruptive Behavior Disorders, mood and anxiety disorders. The results showed that children between 10 and 14 years of age had more than a three-fold increased risk of ADHD compared to younger children (Ashenafi et al., 2001).

Given the serious consequences of failing to intervene as mental illnesses emerge (Belfer, 2008; Burke et al., 2002; Loeber et al., 2000), it is imperative that effective, scalable solutions are discovered, while simultaneously recognizing the cultural and contextual challenges unique

to the settings where evidence-based practices (EBP) are implemented. In most countries in SSA and Uganda in particular, more than half of people with mental health disorders do not access mental health care (Kigozi et al., 2010). In the same way, there is a severe shortage of mental health professionals (Okello & Neema, 2007). For instance, in Uganda, there are about 30 psychiatrists, 1 mental health hospital, and 28 out of patient facilities (Kigozi et al., 2010), all of which are located in Kampala—the capital city. Such facilities are inaccessible to a big swath of the population in a country of 40 million people and hence make early detection, diagnosis, and treatment practically impossible for many people including adolescents. Therefore, to address adolescent mental health as a public health challenge, understanding the questions around access and utilization is critical to minimize the negative consequences of mental illnesses highlighted above.

Child and adolescent mental disorders are unquestionably ubiquitous and burdensome. Therefore, determining and ascertaining the magnitude, severity, and extent of the problem globally is challenging. The major challenge is the lack of data-gathering capacity for epidemiological study. In addition to limited valid and reliable child and adolescent diagnostic measures/instruments, there is also limited cultural and cross-cultural understanding as well as understanding the importance of impairment, which significantly erodes not only proper assessment but the development of appropriate services (Makrides et al., 2007). The aforementioned have therefore undermined the development of effective advocacy, limited policy development, and reduced the likelihood of sustaining appropriate services for children and adolescents with mental disorders. The conditions of poverty, physical and sexual abuse, war and dislocation, forced prostitution, child soldiering, HIV, and other diseases present to varying

degrees across the globe with a severe impact on the magnitude of mental health problems. In some instances—like the current pandemic, the impact is yet to be adequately determined.

3.2 Definition of concepts

Utilization refers to the actual use of mental health services. This entails overcoming barriers to access and enrolling in mental health care. In Anderson's model of needs, he differentiates between realized access—which is actual access to mental health services and potential access—which means availability of enabling resources that potentially increase the likelihood of mental health service use (Andersen, 1995). Thus, utilization seeks to understand whether the program is reaching the appropriate target population. For example, how many individuals with a mental health diagnosis are receiving both in-patient and outpatient care?

The extent of the complete use of services can be at the individual level—the extent to which an individual client uses prescribed/available services or at the community level—the percentage of community members eligible for services and are receiving them. In the same way, services can be either underutilized or over-utilized. Underutilization is defined as clients using a small fraction of the prescribed services. For instance, suppose an adolescent is recommended 16 sessions of multiple family groups and showed up for only four (a quarter of the sessions). This might be construed as underutilization, in which case, it might be difficult to underscore the relevance of such services to an adolescent. On the other hand, overutilization is when some clients use disproportionately huge amounts of resources. For example, a person using 20 relapse prevention sessions yet might need only 10 sessions. A review of Prior studies in LMICs (Patton et al., 2016) indicates that enabling resources, including financial cost and resources, socioeconomic class, region, and transportation are very critical for individuals to actualize utilization of services. Although these dimensions have been widely explored in the past, they

are mostly seen as barriers to access to health care. Thus, increasing access and removing barriers to access has the potential for increased utilization of mental health services.

Access is widely agreed upon as a vital terminology in health care and mental health services research as well as a concept that is difficult to define (Aday & Andersen, 1974; Penchansky & Thomas, 1981). For instance, Anderson and Aday (Aday & Andersen, 1974) argue that access is difficult to operationalize and thus has been mainly used for political purposes. Additionally, there is great confusion in the literature between access, availability, and acceptability (Penchansky & Thomas, 1981). Yet, simply put, availability does not equal access. This is because establishing hospital facilities does not guarantee that individuals will use them. For example, if a mental health facility is built far away from the people, accessibility will be limited. Similarly, if it is built across traditionally hostile territories, individuals from another territory might boycott/fear using the facility. In other cases, the cost of using the facility might impede even the closest individuals from accessing it, and finally, stigma might pose a huge barrier to access (these and other barriers of access to mental health services are explicated further in this chapter below). In the same way, Cabieses, & Bird (Cabieses & Bird, 2014) developed a model for defining concepts related to access and utilization of mental health services depicted below:

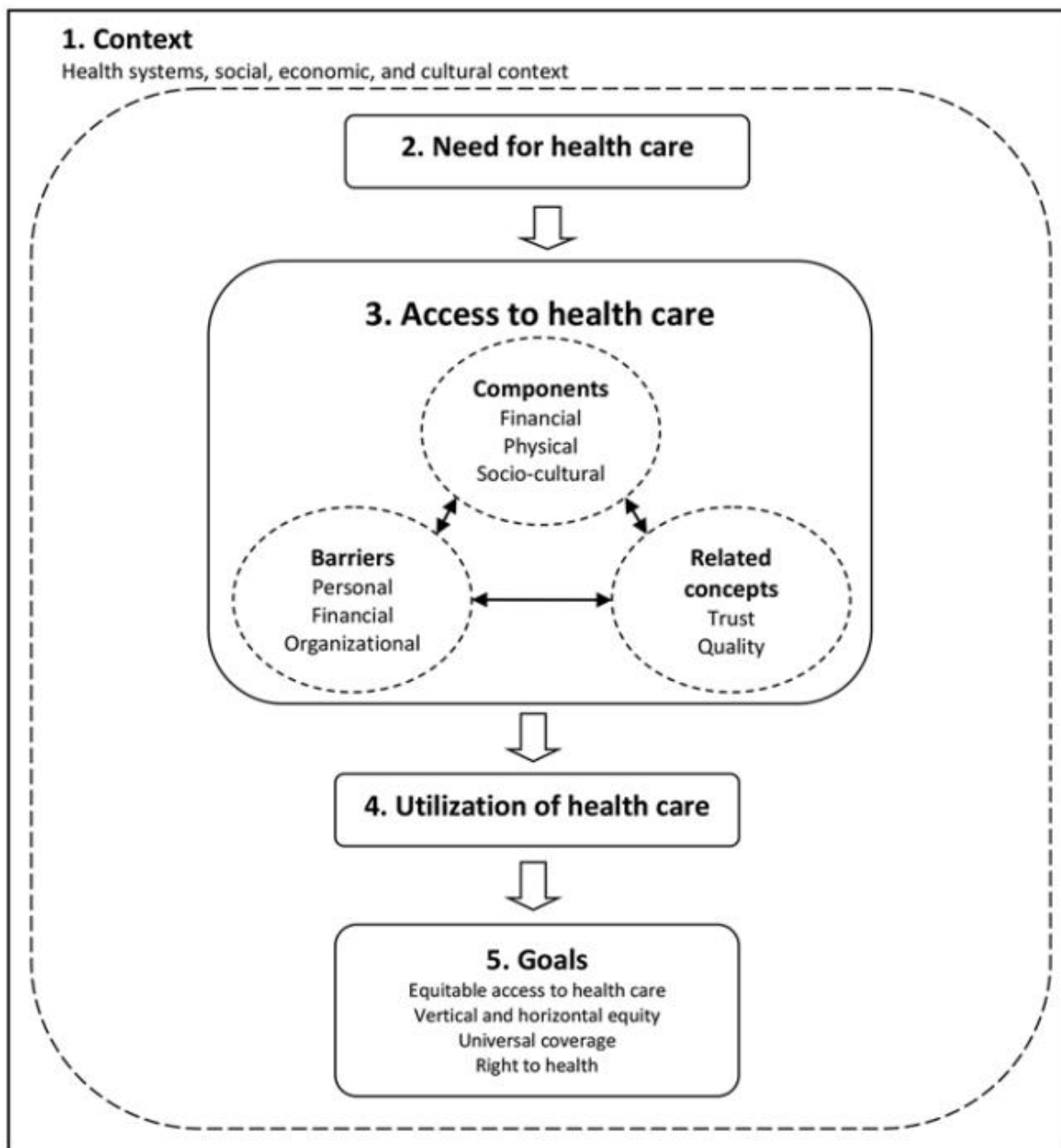


Figure 1. A framework of access to health care and related concepts for LMICs.

Cabieses and Bird, 2014, developed this framework.

The model argues (Cabieses & Bird, 2014) that the need for health care determines both access and utilization. However, for individuals to utilize mental health services, barriers to access have

to be removed or minimized. In addition, there must be trust of the health care professionals and institutions as well as good quality services. Thus, a combination of these factors facilitates the utilization of mental health care with the overall goal of ensuring that individuals have access to quality and equitable mental health services.

Furthermore, in 1981, Penchansky, & Thomas made a daring attempt to define access as (Penchansky & Thomas, 1981) pg 128);

"A concept representing the degree of "fit" between the clients and the system"

This definition denotes the fact that individuals should be able to access health care conveniently. This means that there should be a perfect synchronization between individuals' needs and the healthcare system. The definition further points to the idea that the channels of entry to the health care system should be well delineated and known to the individuals, hence access requires the existence of extensive professionals, facilities, and services that are well known. Furthermore, access involves not only availability but also accessibility, accommodation, affordability, and acceptability. Further examination of these concepts indicates their relevance to access. For example, affordability—defined as the cost of mental health services in relation to the client's income, examines factors such as health insurance, income, and ability to pay. Thus, affordability can be associated with the cost of healthcare, and having insurance or publicly funded programs can increase affordability, which in turn, increases access.

Similarly, availability refers to the supply and nature of existing services and facilities. In respect to mental health services, it refers to the adequacy of social workers, psychologists, psychiatrists, and other helping professions and facilities such as hospitals, clinics, specialized treatment facilities, and community-based programs.

Accessibility, on the other hand, examines the relationship between the location of mental health-based facilities and individuals experiencing mental illnesses. Specifically, it focuses on factors related to the cost of transport, travel time, distance, and cost of mental health services.

Furthermore, accommodation—defined as the fit between the organizational structures of mental health care systems and clients is very critical for access and utilization of mental health services. This includes hours of operation, walk-ins, telephone services, and appointment systems. Related to accommodation is the concept of acceptability. This examines attitudes not only of the clients but also of the providers. For instance, providers may be unwilling to serve certain clients due to financing mechanisms while clients might have preferable provider attributes like age, sex, the religious affiliation of the facility, neighborhood of facility, and ethnicity of the provider. Attitudes on the side of either the provider or client might potentially impede clients from accessing mental health services. These concepts form the bedrock of understanding access. Yet, these dimensions are difficult to disentangle because in some settings accessibility equates to availability while acknowledging that in some areas service availability may equate to varied accessibility. Although availability determines acceptability and accommodation, acceptability seems to be an important dimension in explaining access to mental health care in LMICs. For example, research from LMICs indicates that people with mental illnesses are seeking care from traditional healers, church leaders, and community elders (Abbo et al., 2008; Gureje & Alem, 2000).

3.3 Barriers to access and utilization of mental health services

Concerning the dimensions of access identified above, there are several barriers to accessing and utilizing mental health services in LMICs. Some of the barriers are associated with availability, accessibility, acceptability, and quality (Roberts et al., 2018; Schierenbeck et al.,

2013). For example, in Eastern Cape, South Africa, Schierenbeck and colleagues (Schierenbeck et al., 2013) found that lack of staff, and facilities at community services, and preventive care greatly limited access to mental health services. Indeed, in most LMICs, mental health services professionals are very limited (Roberts et al., 2018; Saxena et al., 2007). For instance, the serious shortage of psychiatrists in low-income countries is illustrated by Chad, Eritrea, and Liberia (with populations of 9, 4.2, and 3.5 million, respectively), which have only one psychiatrist in each country, and by Afghanistan, Rwanda, and Togo (with populations of 25, 8.5, and 5 million, respectively), which have just two psychiatrists each. Low-income countries have a median of less than one psychiatrists and psychiatric nurses per 100,000 population. High-income countries have a ratio of psychiatric health workers to the population that is about 200 times higher. These figures show the huge inequities in the distribution of skilled human resources for mental health across the world.

Physical or geographical barriers: Factors such as the distance to appropriate health care facilities and insufficient transport to reach services may act as physical barriers to care. A recent study in Uganda, for example, found that there are 28 outpatient mental health facilities without any national coverage of community healthcare, highlighting the importance of geographical barriers to access for health outcomes (Molodynski et al., 2017; Roberts et al., 2018). Rural populations also have inadequate access to care, since mental health professionals in most LMICs tend to live in and around the largest cities. Of the 20 countries that assessed their mental health systems with the WHO Assessment Instrument for Mental Health Systems (AIMS) method, 12 reported that rural populations were under-represented among users of outpatient services (WHO, 2009). Although this seems like a huge challenge, conventional knowledge indicates that if the service is acceptable, individuals and communities might be willing to trek

long distances to access the service. Therefore, acceptability is a critical factor in access to any health-related services. Similarly, six of 13 countries reported that ethnic and religious minorities were under-represented in the use of outpatient services (WHO, 2009). The main reason for this barrier to access was that services did not use strategies to deliver care equitably to all groups. In addition, several barriers were identified related to accessibility including lack of transport, lack of information, stigma, and traditional cultural beliefs and values of the community (Molodynski et al., 2017; Thornicroft, 2006). Most individuals in low-resource settings do not own a vehicle and public transport systems do not exist or are underdeveloped. Thus, individuals have to walk long distances or incur huge transport costs to go to mental health facilities.

Human resources and financial barriers: Alongside geographical barriers are the scant investment and thin resources in mental healthcare by governments in LMICs. Most governments in LMICs allocate far fewer resources to mental health funding compared to the burden of mental illnesses and the availability of cost-effective and affordable interventions (Saxena et al., 2007). Indeed, the lowest spending on mental health is by the poorest countries. Yet, individuals with the highest deprivation are more likely to be in most need with unmet mental health needs. In the same vein, mental health professionals in LMICs are very scarce and the problems are likely to persist in the near future. As earlier indicated in chapter one, there are wide resource variations between countries, regions, and communities as countries move on the continuum of wealth from low income to middle and high-income status. Concern about the scarcity of human resources for mental health in low-income and middle-income countries is worsened by reports of large-scale migration of mental health professionals to countries with higher incomes (Ndeti et al., 2004; Patel & Kleinman, 2003; Roberts et al., 2018). The migration of mental health professionals cripples the development of robust mental health

systems in LMICs. In addition, there is inadequate training for mental health professionals, which makes it difficult to close the professional gap (WHO, 2007). In South Africa, for example, a study found that a lack of cross-cultural understanding among staff and staff's traditional cultural beliefs were strong impediments to mental health access (Schierenbeck et al., 2013). They further identified limited training for staff and limited organizational capacity, two of the barriers related to the quality of services received by individuals with mental illnesses. This is evident in situations where mental health is being integrated into primary health care without sufficient training and resources for the professionals.

Socioeconomic status: Poverty is both a risk factor for developing mental health problems and a barrier to access mental health services (Patel & Kleinman, 2003). Being poor does not only mean a lack of money but also involves other social effects including social exclusion, social vulnerability, and denial of opportunities and choice (Patel et al., 1998). UN agencies and other international institutions like the World Bank have extended this understanding of poverty. For instance, the UN Development Programme employs the Human Development Index as a comparative composite measure of social and health indicators such as life expectancy, literacy, education, and standard of living (UNDP, 2006; World Bank, 2001). Children born into poverty face various risk factors for mental and physical illness. Risk factors in poor children's families and communities combined with the scarcity of protective factors increase the likelihood of mental health problems and developmental disabilities (Durkin, 2002; Richter, 2003). Thus, poverty increases the risk for children and adolescents to experience mental health problems (Murali & Oyebo, 2004).

Poverty and its associated psychosocial stressors, such as violence, unemployment, and insecurity, are correlated with the onset of adult mental disorder (Patel & Kleinman, 2003;

Saxena et al., 2007). Epidemiological data from five studies in low-income and middle-income countries showed that people with low education and low income were most vulnerable to common mental disorders, irrespective of the society in which they lived, and that relative poverty was a risk factor for common mental disorders (Patel et al., 1998). In their review of studies from LMICs in Africa, Asia, and Latin America, Patel and Kleinman consistently found that poverty and less participation in the education system were linked to an increase in mental disorders (Patel & Kleinman, 2003).

Gender is also an important determinant of mental disorders, help-seeking, and the need for services (Oliver et al., 2005). In many countries, more women than men meet the criteria for common mental disorders such as anxiety and depression. In Chile, Araya and colleagues showed that women, and especially those with little education and in low social classes, had high rates of common mental disorders (Araya et al., 2001). In addition, Harpham and colleagues in Columbia (Harpham et al., 2005) as well as Patel and colleagues in India (Patel et al., 1998) have documented similar results. Specifically, in India, the study showed that nearly half of people who attended primary care experienced common mental disorders and that such disorders were associated with poverty and female sex, after controlling for other social and demographic variables. In such circumstances, access to scarce resources is very limited for children and adolescents with mental illnesses. Additionally, low incomes and a large proportion of young people in many LMICs exacerbates inaccessibility to mental health services (Belfer & Saxena, 2006; Roberts et al., 2018; Shatkin & Belfer, 2004).

Stigma and discrimination: Globally, the provision of services remains the most important barrier to effective mental health care. Most people with mental disorders receive no effective care; for example, an estimated 76% to 85% of individuals with serious psychiatric

conditions living in resource-limited settings do not receive the treatment they need (Collier & Valentin, 2018; Grelotti et al., 2015). Similarly, feelings of shame significantly prevent many individuals to accept mental health problems and prohibit them from accessing services (Saraceno et al., 2007). In a recent study in Uganda, for instance, Molodynski and colleagues reported that stigma is a significant factor in preventing individuals from access to mental health services (Molodynski et al., 2017). Similarly, in Ethiopia, about 75% of relatives of people with diagnoses of schizophrenia or mood disorders said that they had experienced stigma because of the presence of mental illness in the family, and 37% wanted to conceal the fact that a relative was ill (Shibre et al., 2001). Similar views have been expressed in South Africa (Stein et al., 1997), and Siberia and Mongolia (Dietrich et al., 2004). Thus, families caring for individuals with mental disorders feel blamed and rejected by family and community. Thus, to avoid shame, most of them prefer not to seek care. For instance, in India, the fear of stigma on marriage prospects led family members to hid relatives suffering from schizophrenia (Thara et al., 2003).

Young people with mental illnesses report very low help-seeking behaviors and previous research has not fully explained the scenario (Burns & Rapee, 2006). Low levels of so-called mental health literacy (i.e., the ability to correctly identify mental illness in oneself or one's peers) in addition to negative emotional responses or attitudes to people with mental illness (i.e., stigma) were identified as potential reasons for low help-seeking of health care by young people (Burns & Rapee, 2006). Young people who seek and receive mental health care also face barriers to care (Saraceno et al., 2007). Compared with adults, young people have less favorable attitudes towards people with mental illness, (Corrigan et al., 2005) and young people with mental illness might be exposed to more stigma than adults (Corrigan et al., 2005). Because young people are often embarrassed about mental illness and believe that it should be handled privately, they tend

to seek help from family and close kin and less often from outsiders (Corrigan et al., 2005). Stigma is, therefore, a barrier to seek help by young people for mental illnesses (Gould et al., 2004).

Problems with access, or more specifically with any of the component dimensions of access, are presumed to influence clients and the system in three measurable ways. First, utilization of services, particularly entry use, will be lower, other things being equal. Secondly, clients will be less satisfied with the system and/or the services they receive. Finally, provider practice patterns may be affected, such as when inadequate supply resources cause physicians to curtail preventive services, devote less than appropriate amounts of time to each of their patients or use the hospital as a substitute for their short supply.

Intersectionality: As clearly delineated in chapter one, mental illnesses significantly impact adolescents in LMICs. Secondly, epidemiological research indicates that most mental illnesses begin in early or late adolescence, most often between 11-18 years, with the potential to persist through adulthood (Belfer, 2008; Kessler et al., 2007; Kessler et al., 2005). However, some studies suggest that some adolescent symptomology does not persist especially if the episodes are brief (Patton et al., 2014). The most commonly reported mental illnesses among adolescents are depression, suicide, alcohol and illicit drug use, anti-social behavior, and disruptive behavioral disorders. Therefore, the bedrock of much global mental health has focused on early detection and intervention through embedding mental health care into primary health care settings. Despite the growing reports that this has increased access to mental health care among adolescents, there is limited evidence to support the improvement of adolescent mental health (Patel et al., 2013).

Given the complexity and diversity of international child and adolescent mental health, it is difficult to apply universal principles because of how societies create their health care systems, so the way they are shaped, in their structure, process, and expected outcomes, entirely depends on what each society defines as relevant, meaningful, approachable and sustainable. The understanding and application of these terms vary by society and people. For instance, financial access in several SSA countries can have a different meaning given that most of them provide a form of universal health care coverage or a quasi-private-public partnership. Overall, the choice of framework and interpretation of concepts must take into account a host of context-specific factors including the organization of the health care system, income, education, geography, and the social-cultural factors of individuals who use – or wish to use – the system.

3.4 Perceived Social Support and Depressive Symptoms

People who have supportive relationships, such as friends, relatives, and other people, across communities and cultures, have a better self-image and can deal with life challenges or difficult circumstances. Social support improves one's quality of life and acts as a shield to life's adversities (Lazarus, & Folkman, 1984; Kaniasty, & Norris, 2008; Ren, Qin, Zhang, & Zhang, 2018). Social support can be viewed in the form of perceived and actual. Lakey and Scoboria (2005) argue that perceived social support is characterized as an individual's subjective belief that their social network can provide effective assistance in times of need while obtained support refers to the reception of actual assistance typically within a set time frame (Uchino, 2009). Consequently, the value of positive social relationships for physical and psychological well-being has long been well established (Deiner & Seligman, 2002).

For many adolescents living in low-resource settings like in sub-Saharan African (SSA), social support is a critical component of their wellbeing, which enhances psychosocial well-

being and health (Nyamukapa et al., 2010; Kagotho, 2012). Social support, for example, has positively impacted the psychological well-being of AIDS-affected adolescents in Uganda, who face numerous stressors such as orphanhood, family poverty and insecurity, limited healthcare, child labor, physical violence, trauma and stigma, and discrimination (Nyoni, Nabunya, & Ssewamala, 2019). Among adolescents, perceived support has been linked to positive health and mental health outcomes (Danielsen, Wiium, Wilhelmsen, & Wold, 2010; Betancourt et al., 2013), while perceived low support has been linked to more behavioral challenges and inadequate social connection during childhood and adolescence (Danielsen, Wiium, Wilhelmsen, & Wold, 2010; Cluver, Orkin, Gardner, & Boyes, 2012).

Social support from various sources, such as parents, family members, teachers, and friends, appears to be a protective factor for psychosocial well-being (self-concept and depressive symptoms) in HIV/AIDS-affected adolescents in Uganda and South Africa (Cluver, Orkin, Gardner, & Boyes, 2012; Cluver et al., 2007; Nyoni et al., 2019). According to a study conducted in the United States, Zhang and colleagues (2017) found that social support improves depression by first improving adolescents' self-esteem. By explaining the social support-to-distress relationship and predicting that social support mitigates the likelihood of depression, these studies used a social causation model that assumes that social support is a mediator of well-being (Burke, Sticca, & Perren, 2014).

Given these studies' findings that social support has a direct relationship with depression, there is a clear need to examine social support as a mediator for depression among SSA adolescents. Understanding the indirect relationship between social support and depression is crucial for developing interventions that can effectively mitigate depression among vulnerable adolescents in SSA.

Chapter 4: Research Methods

This dissertation analyzed data from the Suubi4Her study. At the time of completing this dissertation, the parent study is still ongoing. Participant enrollment has been completed. However, the study will follow up with participants for an extra 2 years. This chapter describes the primary data and analyses that were conducted—hereafter described as the parent study—including subjects, data collection procedures, the intervention and measures, and analytical plan.

4.1 Parent study

Data for the parent study (Suubi4Her) was funded by the grant from the National Institute of Mental Health (NIMH; grant number: R01 MH113486; PI: Fred Ssewamala). The Suubi4Her study is a prospective cluster-randomized clinical trial (2017-2022). The study will deploy and test an innovative combination intervention aimed at preventing HIV risk behaviors among 15 to 17-year-old adolescent girls living in low-resource settings impacted by HIV/AIDS in Uganda. Specifically, the parent study implemented three specific aims.

1. Examine whether the Suubi4Her intervention is effective in protecting adolescent girls against known HIV risk factors.
2. Elucidate the effects of the Suubi4Her intervention on mental health functioning and examine the effects of these variables as potential mechanisms of change, mediating the relationship between each intervention and HIV risk reduction.
3. Evaluate the cost-effectiveness of each intervention condition.

However, for this dissertation, the overall goal of the proposed study is to examine mental health service utilization among adolescent girls in Uganda as well as examining the Andersen model's constructs associated with mental health utilization. Specifically, this dissertation study addressed four aims including exploring the short-term impact of an evidence based mental health intervention on depressive symptoms among 1260 school-going adolescent girls in southern Uganda. The second aim documents the prevalence of depressive symptom severity and describe their characteristics among 317 school-going adolescent girls in southern Uganda. The third aim describes the patterns of mental health service utilization and explore how predisposing, enabling, and need factors are associated with mental health service utilization among school-going adolescent girls in southern Uganda. The fourth and last aim explore pathways between predisposing, enabling, and need factors and how the pathways vary by mental health service utilization.

The parent study is being conducted in the southwestern region of Uganda, a region heavily impacted by HIV and AIDS with two percentage points higher than the national average of 6% (MoH, 2018). In addition, adolescent girls in Uganda have four-folds HIV infections than adolescent boys (MoH, 2018).

4.1.1 Subjects

In the parent study, 1260 adolescent girls (14-17 years) in their first year of school were enrolled in the study and will be followed over four years. Adolescents were eligible to participate if they met the following inclusion criteria: 1) female, 2) age 14–17 years, 3) enrolled in the first or second year of secondary school, and 4) living within a family (broadly defined and not an institution or orphanage, as those in institutions have different familial needs). The main study outcomes are 1) proportion of girls' biologically confirmed STIs (Gonorrhoea, Trichomonas

and Chlamydia); and secondary outcomes: 2) the proportion of new HIV infections during the study period, and 3) for HIV+ girls, viral load and CD4 as markers of ART adherence. To reduce the stigma associated with being HIV positive, all qualifying teenage girls were included in the study regardless of their HIV status. Overall, aim 1 of the study uses the entire study sample (N=1260), aim 2 through aim 4 examines patterns of mental health utilization among a sub sample of the parent study (N=317) of adolescent girls across 12 public secondary schools that took part in a community-based mental health intervention.

In the parent study, adolescents were identified and recruited from 47 public secondary schools located in five geopolitical districts of Rakai, Kyotera, Masaka, Lwengo, and Kalungu in southern Uganda. The schools included in the study were matched and randomized based on the following characteristics: socioeconomic status of the students attending these schools, school size (total number of students enrolled), location (urban vs. rural), and overall performance based on the Uganda Certificate of Education (UCE) examinations, administered by the Uganda Government's Ministry of Education and Sports (Ssewamala et al., 2018).

4.1.2 Data collection procedures

The parent study used interviewer-administered survey instruments to collect data with each survey lasting between 70-90 minutes. In addition, the survey instruments were translated into Luganda—the local language spoken in the study area. To ensure consistency and accuracy, the survey instruments were back-translated into English and the process was overseen by certified language experts at Makerere university institute of languages in Uganda. Local research assistants that were fluent in both English and Luganda collected the data. In addition to completing the Collaborative Institutional Training Initiative Certificate (CITI), research

assistants received a weeklong training on good clinical practice, data collection techniques, and protection of human subjects.

Potential participants and their parents/caregivers were identified with the help of school administrations and the Catholic Diocese of Masaka. Flyers were distributed to parents and caregivers notifying them of the study and they were invited to meet with the in-country project coordinator for a one-on-one informational meeting at school. During the meeting, parents/caregivers and adolescents were informed verbally and in writing of the purpose of the study, voluntary participation, and extent of their participation, risk, and benefits, as well as protection and confidentiality issues. Caregivers and parents who were willing and interested in the study gave written consent for the adolescent girls to participate in the study. In addition, a certified nurse did medical-related procedures including pregnancy, HIV, and STI testing.

4.1.3 Ethical considerations

Participation in the parent study was voluntary. Adolescent written assent to participate was obtained once a caregiver's written consent was received. To avoid potential coercion, the consent and assent activities were done separately for the adolescents and caregivers. All procedures in the parent study were approved by the Institutional Review Board approval at Washington University in St. Louis (IRB- #201703102), the Uganda Virus Research Institute (GC/127/17/07/619), and the Uganda National Council of Science and Technology (SS4406). The parent study is registered in the Clinical Trials database under registration number NCT03307226.

4.1.4 The intervention

The parent study is a three-arm, cluster-randomized control trial (RCT), consisting of two treatment arms and one control arm. To minimize cross-condition contamination, randomization was conducted at the school level. Each of the 47 secondary schools was randomly assigned to either the control arm (n=16 schools, 408 girls) or one of the two treatment arms: treatment 1 (n=16 schools, 471 girls) and treatment 2 (n=15 schools, 381 girls). This dissertation used data from the entire sample for aim 1 and the sub-sample from treatment 2 arm described below for aims 2 through 4. However, due to COVID-19 lockdown restrictions, the intervention was not delivered in three of the treatment two schools. Therefore, the sub-sample data came from 12 public secondary schools.

Participants in the control condition received the bolstered standard of care (BSOC) services for orphaned adolescents in the region including school lunches and scholastic materials. In the addition to the BSOC, participants in the treatment condition 1 received a packaged economic empowerment intervention comprising of a youth development account (YDA), which is a form of economic strengthening held in both the child and caregiver's name, in a well-established and recognized financial institution or bank. The child's family and other relatives were allowed and encouraged to contribute to the YDA. The accumulated savings in a YDA were matched with money from the program by a ratio of 1:1

In addition, treatment Arm 2 participants– Youth Development Accounts (YDA) + Multiple Family Group (MFG) received both the YDA (detailed above) and a family-based dialogue and training delivered via MFG that aims to strengthen family relationships and address mental health challenges that commonly occur in adolescence. MFG is based on building support for families by providing opportunities for parents and children to communicate in a safe setting

with other families who have shared experiences thus allowing each family to benefit from the contributions of one another (Mellins et al., 2014). Advice and insight from other families is often seen as less threatening than feedback given by a therapist (Mellins et al., 2014). In addition, MFG focuses on reducing stigma by normalizing shared experiences. The MFG intervention acknowledges poverty as a stressor that may undermine parenting while also recognizing the contextual challenges that contribute to poor mental health functioning for adolescent girls, including high rates of poverty, violence, and family loss due to HIV and other health threats (Keiley, 2002; Kumpfer et al., 2002; McKay et al., 1995). The MFG approach allows adolescent girls and their families to share their experiences with others in similar situations, thus building hope by providing social support, normalization of similar experiences and struggles, and the sharing of effective solutions (Wahler & Dumas, 1989).

4.1.5 Study Measures

Primarily, the parent study used several measures that are culturally appropriate to the Ugandan context. Specifically, the measures include biomarkers like HIV and STIs testing pregnancy incidence, educational attainment, financial savings behavior, gender attitudes, and self-esteem. In addition, change in mental health functioning, including continuous variables of depression, hopelessness as measured by Beck's Hopelessness scale and adapted versions of the Child Depression Inventory and Tennessee Self-Concept Scales were used.

In this study, however, Andersen's behavioral model of health service use was adapted to examine the relationship between individual-level socioeconomic and demographic factors and mental health service utilization of a family-based intervention—hereafter multiple family groups (Amaka Amasanyufu). According to Andersen's behavioral model, mental health service utilization or service engagement is a function of three major elements: predisposing factors

(socio-demographic factors and exposure to violence), enabling factors (e.g. household asset ownership, residence, education, and distance to the school) and healthcare needs such as screening for depression and anxiety.

Dependent variable

The main dependent variable for this study is mental health utilization. Mental health utilization was measured by participants' attendance in the family-based—Amaka Amasanyufu (Happy Families) intervention. All participants that were assigned to the Multiple Family Group (MFG) intervention were included in the analysis. Using disaggregated data from the 16 sessions, attendance patterns were developed using latent class analysis indicating high attendants vs. low attendants.

Explanatory variables

In the current dissertation, the predisposing factors in the model will include age—measured as a continuous variable at baseline (14-17 years), family size—measured as a continuous category, residence (rural vs. semi-urban), number of children in the family—measured as a continuous variable, orphanhood (orphans vs. non-orphans) and exposure to violence. *The violence index* was created using 12 items adapted from the Multiple Indicator Cluster Survey (MICS) for children aged 5 to 17 (UNICEF, 2018). Participants were questioned about the approaches used for discipline and/or to fix behavioral issues in their families in the previous month. Items were binary coded with 1= “Yes” and 0 = “No.” Summated scores were generated with a range of 0 to 12 with higher scores indicating higher exposure to violence.

In addition, enabling factors included the *household asset index*—measured using a 20-item index (0–20) assessing the availability of tangible household assets (e.g. house, livestock,

garden, and transportation), distance to the school, and perceived social support. *The quality of social support relationships* was measured using 30 items adapted from the Friendship Qualities Scale (Bukowski, Hoza, & Boivin, 1994). The scale assesses the impressions of the quality of children's friendships and relationships with their classmates, peers, teachers, and parents. Respondents were asked to rate how each statement applied to them, on a 5- point Likert scale, with 1=never and 5=always. The theoretical range for this scale is 30-150, with high scores indicating higher levels of social support and relationships. The internal consistency of the scale was acceptable (Cronbach's alpha =0.84).

Finally, need factors included depressive symptom severity.

The *Beck Depression Inventory* (BDI) (Beck et al., 1961) measured depressive symptoms. The scale measures characteristic attitudes and symptoms of depression including mood, pessimism, and sense of failure, self-dissatisfaction, guilt, punishment, self-dislike, self-accusation, suicidal ideas, crying, irritability, social withdrawal, indecisiveness, body image change, work difficulty, insomnia, fatigability, loss of appetite, weight loss, somatic preoccupation, and loss of libido. The scale consists of 21 sets of statements, ranked based on the severity on a 4-point continuum (0=least, 3=most). The theoretical range for the BDI is 0-63, with higher scores indicating higher levels of depressive symptoms. The scale demonstrated a high internal consistency (Cronbach's alpha =0.83).

4.1.6 Analytical Approach

The first step in the study was to examine the sample's socio-demographic characteristics. The means and standard deviations, as well as frequencies and measures of central tendency, are presented. Secondly, the treatment and control conditions' characteristics were compared to see if there were any similarities or disparities in main socio-demographic characteristics. Participants'

depressive symptoms were also assessed to see if there were noticeable differences between the treatment and control groups at baseline and 12 months after the intervention.

To address research question one, a three-level mixed-effects model was run to examine the short-term effect of the multiple family group intervention on depressive symptoms. The model assessed the time \times intervention interaction in changes in depression scores using participant-specific follow-up intervals (baseline to 12-months). In this study, individuals are nested within each school, and observations are nested within each individual, so the multilevel model was useful to account for data clustering. In the case of missing data, a mixed effect model allows for estimates of changes in repeated measures, assuming the data is missing at random. Random intercepts for school ID and random intercepts and slopes for person ID were included to account for clustering. The unstructured covariance pattern for the random effects (Fitzmaurice, Laird, & Ware, 2011) was used in the analysis. The model included the study group status (YDA, YDA+MFG, or control conditions), a time point variable (baseline and 12-month follow-up), and their interactions. To safeguard against misspecification of standard errors and possible assumption violations (e.g., non-constant or non-normal residuals in linear mixed models), the model was fit with robust standard errors (Huber–White “sandwich” variance estimator) clustered by school ID for the composite depression scores (Rao & Scott, 1984; White, 1980). Unstandardized regression coefficients (β) and the 95% confidence interval (CI) are presented in Table 5.2. All analyses were conducted using Stata SE. Version 16 (StataCorp, 2017).

To address question two, summary statistics of predisposing, enabling, and need factors were calculated using means and standard deviation (SD) for continuous variables, and frequencies and proportions for categorical variables. The prevalence of depressive symptoms

was calculated based on the scoring guidelines in non-clinical populations, with a score of 20 considered as the cut-off for either presence or absence of depressive symptoms. Logistic (for categorical outcomes) and linear (for continuous outcomes) regression models were conducted using cluster-adjusted robust standard errors to adjust for within-school clustering. This was done to assess differences in depressive symptom severity and patterns of mental health service utilization across predisposing, enabling, and need variables at baseline. I report the Rao-Scott F -statistic (Rao & Scott, 1984) for categorical variables and adjusted Wald F -statistics (design-based F) for continuous variables examining individual-level group differences on study predictors. P -values were set a priori and less than 0.05 was considered statistically significant.

To answer question 3 exploring different patterns of mental health utilization, Latent Class Analysis (LCA) was used to empirically identify patterns of the intervention utilization. Data for the LCA model came from 12 secondary schools based in rural southcentral Uganda; these schools participated in the multiple family group (MFG) intervention over 16 weeks involving 317 adolescent girls.

Beginning with a one-class solution, the study tested the number of latent classes iteratively. In the subsequent models, a greater number of classes were added incrementally and tested using the model fit of solutions. To determine class membership, the following model fit indices were used to guide the analyses: the Akaike information criterion (AIC; Akaike, 1987) and the Bayesian information criterion (BIC; Raftery, 1995). For this analysis, the AIC was considered as the most reliable of these information criteria indices, with lower AIC values indicating a good model fit. To examine how well indicators represented class membership, the entropy score was calculated for each model, with higher entropy scores (closer to 1 or $>.8$) indicating better class representation (Nylund et al., 2007). LCAs were fitted using *Mplus*

version 8. The LCA analyses used cluster-adjusted standard errors and test statistics to account for clustering at the school level (*Mplus* model type = complex).

In addition, to examine the hypothesized factors (predisposing, enabling, and need factors) associated with patterns of mental health service utilization, hierarchical logistic regression models regressing attendance classification onto predisposing, enabling, and need factors were fitted using Stata 16. Using cross-sectional data, three models were conducted with each model controlling for a block of predictors. Model one (predisposing factors only), included predisposing factors, including socio-demographic factors. Model two (predisposing + enabling factors) included both predisposing (indicated above) and enabling factors including household assets ownership, social support, and distance to school. In addition to the predisposing and enabling factors above, model three (predisposing + enabling + need factors) included need factors including depressive symptoms. A cluster-robust sandwich estimator of variance to account for within-school correlation was used.

To address research question four examining the direct and indirect pathways between predisposing, and need factors, structural equation modeling (SEM) models were conducted based on the hypotheses described above examining the structural relationships between predisposing, enabling, and need factors and how these vary by mental health utilization patterns among adolescent girls.

All SEM analyses were conducted in *Mplus* 8 (Muthén & Muthén, 2018) with maximum likelihood estimation (Bowen & Guo, 2011). The cluster option in *Mplus* was used to account for the possibility of nonindependence of observations due to the clustering of participants in schools. SEM was conducted to assess the hypothesized structural relationships. The first model addressed *H4a* (*i.e.*, There is a direct relationship between Predisposing factors and need

factors). The second model addressed *H4b* (i.e., There is an indirect relationship between predisposing and needs factors, through enabling factors). The third model examined *H4c* (i.e., the hypothesized indirect effect in H4b will vary by mental health utilization patterns). All structural models, direct and indirect associations were tested simultaneously to address the question of whether the mediation, if any, was full or partial. I report the model chi-square and the root mean square error of approximation (RMSEA). In addition, the following fit indices were used to evaluate the fit of the structural model: the standardized root means square residual (SRMR) with values $\leq .08$ denoting good model fit and .08 to .10 denoting mediocre fit and comparative fit index (CFI) (acceptable if $> .90$, good if $> .95$) (Hu & Bentler, 1999; Kline, 2005).

Data were examined for missing cases at baseline and 12-month follow-up using univariates. Only three percent ($n=41$) of cases were missing at 12 months, which is an acceptable level of missing data (less than 10% [Bennett, 2001]).

Chapter 5: Findings

5.1. Aim 1: The short-term impact of an evidence based MH intervention on depressive symptoms among 1260 school-going adolescent girls.

This section answers aim 1 of the dissertation, which explores the short-term effect of an evidence based intervention—hereafter referred to as the multiple family group intervention—on depressive symptoms among adolescent girls. At baseline, the average adolescent was 15 years across all the study conditions, living on average in a household with seven adults and three children below 18 years. In addition, the average depression score was almost the same across the study conditions (See table 5.1). The effect of the evidence-based intervention on depressive symptoms at baseline and 12 months post-intervention initiation results are illustrated in Table 5.2.

At 12-months post-intervention initiation, the results indicate that the intervention was effective in reducing depressive symptoms ($\beta=-2.53$; 95% CI: -3.60, -1.45, $P<.001$; See table 5.2). In addition, the results showed a decline in depressive symptoms across both intervention groups. However, at 12-months post-intervention initiation the group that received the multiple family groups was statistically different compared to the control condition ($\beta=-2.14$; 95% CI: -3.68, -.61, $P<.01$; see figure 1).

Table 5.1. Sample Characteristics at baseline (n=1260)

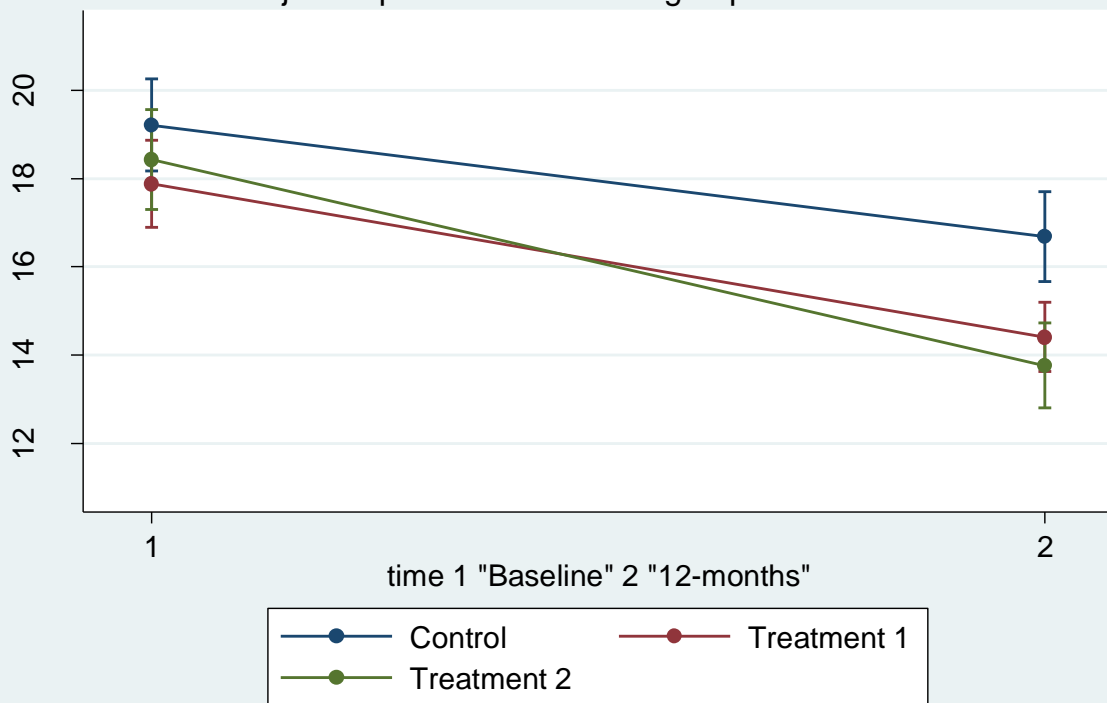
Characteristics	Control (n=408), Mean (SD) or %	Treatment 1 (n=471), Mean (SD)	Treatment 2 (n=381), Mean (SD)
Age (14-17 years)	15.18 (.86)	15.49 (.82)	15.43 (.90)
Household size	6.81 (2.61)	7.03 (2.66)	7.17 (2.85)
Number of children in the household	3.39 (2.06)	3.49 (2.17)	3.62 (2.05)
Depressive symptoms at baseline	19.18 (10.29)	17.85 (10.17)	18.48 (10.07)
Depressive symptoms are 12 months	16.62 (9.98)	14.35 (8.87)	13.80 (9.11)

Table 5.2. Regression Results for depressive symptoms among adolescent girls in Uganda, 2017-2018 (n=2479)

Outcomes	Depressive symptoms, B (95% CI)	P-value
Time		
Baseline (reference group)	0	
12-months	-2.53 (-3.60, -1.45)	<.001
Group		
Control (Reference group)	0	
Intervention 1: YDA	-1.34 (-2.78, .100)	0.068
Intervention 2: YDA+MFG	-.78 (-2.33, .76)	0.320
Group × time		
YDA × 12 months	-.94 (-2.21, 0.34)	0.151
YDA+MFG × 12 months	-2.14 (-3.68, -.61)	0.006
Constant	19.21 (18.17, 20.26)	<.001
Sample size	2479	

Note: YDA=Youth Development Accounts; MFG=Multiple Family Groups

Figure 1: Depressive symptoms total score from baseline to 12 months.
Adjusted predictions of time#group with 95% CIs



5.2. Aim 2: Socio-demographics and household characteristics of adolescent girls in the MFG intervention

Aim 2 through 4 used a reduced sample for adolescent girls that participated in the MFG intervention. The baseline socio-demographic and household characteristics of the sample are described in Table 5.3. Baseline sample descriptions identified based on the Andersen model of health care utilization are explained below. Specifically, at baseline, adolescent girls were aged 15 years ($SD=0.89$) on average, and lived in families with an average of 7 adults ($SD=2.9$) and 3 children—below 18 years ($SD=2.07$). In addition, adolescents reported, on average, moderate exposure to physical and emotional violence ($M=4.03$, $SD=2.48$), which are reported barriers to help seeking among adolescents. Moreover, a majority of the participants (64.98%, $n=206$) were in rural-based schools, locations that tend to report limited access to mental health services. Orphanhood predisposes adolescents to stressors and including depression, which negatively impacts their health seeking behaviors. In this study, 20.19% ($n=64$) had lost at least one or both parents, with an overall moderate depression mean score of 18.53 ($SD=10.23$; range 0-44).

Furthermore, the Andersen model posits that individual and or family income including an individual's income and wealth used to pay for health are associated with increase in utilization of mental health services. Adolescents reported an average of 11 ($SD=3.34$; range 3-19) assets owned in the family. In addition, having social support is theoretically hypothesized to increase use of mental health because family members and other support networks can take the person experiencing mental distress for treatment. In this regard, participants reported high quality of social support ($M=116.41$, $SD=15.63$) received from peers, teachers, and family members. Additionally, distance to school was assessed by asking respondents to choose between two different options: near (about 0-2 km, one could walk), or far (over 2 km, one could

not easily walk) because long distances away from services limit access and use of mental health services. Slightly more than half of the participants (54%) reported that they lived within walking distance of their school. Finally, by the time of this study (24 month-follow up) participants had attended an average of ten multiple family group sessions ($M=10.60$, $SD=5.90$; range 1-16) (see Table 5.3).

Table 5.3. Socio-demographics and household characteristics of the sample (n=317)

Variables	n (%)	Mean(SD)	Range
<i>Predisposing factors</i>			
Age (years)		15.41 (.89)	14-17
No. of adults in the family		7.14 (2.9)	2-31
No. of children		3.64 (2.07)	0-11
Exposure to violence index		4.03 (2.48)	0-12
<i>Residence</i>			
Urban	111 (35.02)		
Rural	206 (64.98)		
<i>Orphanhood status</i>			
Orphans	64 (20.19)		
Non-orphans	253(79.81)		
<i>Enabling factors</i>			
Social support from multiple sources		116.41 (15.63)	77-150
Household asset index		11.15 (3.34)	3-19
<i>Distance to the school</i>			
Near (0-2 kms)	173 (54.57)		
Far (over 2 kms)	144 (45.43)		
<i>Need factors</i>			
Depressive symptoms		18.53 (10.23)	0-44
<i>Outcome variable</i>			
Attendance		10.60 (5.90)	0-16

5.2.1. Participants' depressive symptoms

To address aim 2, which documents the prevalence of depressive symptom severity and describes characteristics, data from 317 school-going adolescent girls in southern Uganda who participated in the evidence-based intervention was used. Participants from 12 secondary schools participated in a 16-weeks manualized intervention—Hope for families—facilitated by parent peers and community health workers. Three schools in the treatment condition did not receive the intervention due to COVID-19 lock down in Uganda hence were not included in the analysis. Participants' itemized and average scores at baseline and 12 months follow-up were used (See table 5.4). There was a substantial decline in depressive symptoms between baseline and 12-months follow-up after participating in the intervention. Specifically, the overall mean score for

depressive symptoms was statistically different between baseline and at 12-months follow-up (18.53 vs. 13.54, $t(304)=7.55$; $p<.001$). The scale demonstrated a high internal consistency (Cronbach's alpha =0.82) at both baseline and 12-months follow-up. In addition, using the recommended cut-off of 20 (Beck, Steer, & Brown, 1996), the results indicate that 41% (n=129) of adolescent girls evidenced mild to severe symptoms of depression at baseline.

Table 5.4. Beck's Depression Inventory (BDI) (n=317)

Variable	Baseline Frequency <i>N</i> (%)	12-months Frequency <i>N</i> (%)
I do not feel sad.	164 (51.74)	175 (57.38)
I feel sad.	59 (18.61)	63 (20.66)
I am sad all the time, and I can't snap out of it.	45 (14.20)	32 (10.49)
I am so sad and unhappy that I can't stand it	49 (15.46)	35 (11.48)
I am not particularly discouraged about the future.	217 (68.45)	240 (78.69)
I feel discouraged about the future.	51 (16.09)	33 (10.82)
I feel I have nothing to look forward to.	27 (8.52)	15 (4.92)
I feel the future is hopeless and that things cannot improve	22 (6.94)	17 (5.57)
I do not feel like a failure.	229 (72.24)	243 (79.67)
I feel I have failed more than the average person.	30 (9.46)	36 (11.80)
As I look back on my life, all I can see is a lot of failures	32 (10.09)	15 (4.92)
I feel I am a complete failure as a person.	26 (8.20)	11 (3.61)
I get as much satisfaction out of things as I used to.	176 (55.52)	203 (66.56)
I don't enjoy things the way I used to.	60 (18.93)	50 (16.39)
I don't get real satisfaction out of anything anymore.	40 (12.62)	30 (9.84)
I am dissatisfied or bored with everything.	41 (12.93)	22 (7.21)
I don't feel particularly guilty	131 (41.32)	146 (47.87)
I feel guilty a good part of the time	120 (37.85)	119 (39.02)
I feel quite guilty most of the time	45 (14.20)	32 (10.49)
I feel guilty all of the time.	21 (6.62)	8 (2.62)
I don't feel I am being punished.	172 (54.26)	193 (63.28)
I feel I may be punished.	63 (19.87)	55 (18.03)

I expect to be punished.	52 (16.40)	39 (12.79)
I feel I am being punished	30 (9.46)	18 (5.90)
I don't feel disappointed in myself.	235 (74.13)	252 (82.62)
I am disappointed in myself.	34 (10.73)	20 (6.56)
I am disgusted with myself.	31 (9.78)	18 (5.90)
I hate myself.	17 (5.36)	15 (4.92)
I don't feel I am any worse than anybody else.	85 (26.81)	106 (34.75)
I am critical of myself for my weaknesses or mistakes.	42 (13.25)	48 (15.74)
I blame myself all the time for my faults.	111 (35.02)	100 (32.79)
I blame myself for everything bad that happens.	79 (24.92)	51 (16.72)
I don't have any thoughts of killing myself.	260 (82.02)	267 (87.54)
I have thoughts of killing myself, but I would not carry them out.	34 (10.73)	22 (7.21)
I would like to kill myself.	13 (4.10)	13 (4.26)
I would kill myself if I had the chance.	10 (3.15)	3 (0.98)
I don't cry any more than usual.	162 (51.10)	176 (57.70)
I cry more now than I used to.	22 (6.94)	22 (7.21)
I cry all the time now.	18 (5.68)	19 (6.23)
I used to be able to cry, but now I can't cry even though I want to.	115 (36.28)	88 (28.85)
I am no more irritated by things than I ever was.	151 (47.63)	173 (56.72)
I am slightly more irritated now than usual.	29 (9.15)	35 (11.48)
I am quite annoyed or irritated a good deal of the time.	109 (34.38)	85 (27.87)
I feel irritated all the time.	28 (8.83)	12 (3.93)
I have not lost interest in other people.	114 (35.96)	169 (55.41)
I am less interested in other people than I used to be.	86 (27.13)	73 (23.93)
I have lost most of my interest in other people.	42 (13.25)	22 (7.21)
I have lost all of my interest in other people	75 (23.66)	41 (13.44)
I make decisions about as well as I ever could.	162 (51.10)	205 (67.21)
I put off making decisions more than I used to.	49 (15.46)	32 (10.49)
I have greater difficulty in making decisions more than I used to.	61 (19.24)	33 (10.82)
I can't make decisions at all anymore.	45 (14.20)	35 (11.48)
I don't feel that I look any worse than I used to.	221 (69.72)	254 (83.28)
I am worried that I am looking old or unattractive.	15 (4.73)	16 (5.25)

I feel there are permanent changes in my appearance that make me look unattractive	59 (18.61)	31 (10.16)
I believe that I look ugly.	22 (6.94)	4 (1.31)
I can work about as well as before.	180 (56.78)	215 (70.49)
It takes an extra effort to get started at doing something.	45 (14.20)	33 (10.82)
I have to push myself very hard to do anything.	78 (24.61)	49 (16.07)
I can't do any work at all.	14 (4.42)	8 (2.62)
I can sleep as well as usual.	173 (54.57)	216 (70.82)
I don't sleep as well as I used to.	33 (10.41)	14 (4.59)
I wake up 1-2 hours earlier than usual and find it hard to get back to sleep.	44 (13.88)	29 (9.51)
I wake up several hours earlier than I used to and cannot get back to sleep.	67 (21.14)	46 (15.08)
I don't get more tired than usual.	176 (55.52)	213 (69.84)
I get tired more easily than I used to.	49 (15.46)	41 (13.44)
I get tired from doing almost anything.	72 (22.71)	42 (13.77)
I am too tired to do anything.	20 (6.31)	9 (2.95)
My appetite is no worse than usual.	190 (59.94)	233 (76.39)
My appetite is not as good as it used to be.	65 (20.50)	39 (12.79)
My appetite is much worse now.	43 (13.56)	20 (6.56)
I have no appetite at all anymore.	19 (5.99)	13 (4.26)
I haven't lost much weight, if any, lately.	221 (69.72)	242 (79.34)
I have lost more than five pounds.	58 (18.30)	37 (12.13)
I have lost more than ten pounds.	23 (7.26)	18 (5.90)
I have lost more than fifteen pounds.	15 (4.73)	8 (2.62)
I am no more worried about my health than usual.	186 (58.68)	224 (73.44)
I am worried about physical problems like aches, pains, upset stomach, or constipation.	53 (16.72)	41 (13.44)
I am very worried about physical problems and it's hard to think of much else.	44 (13.88)	22 (7.21)
I am so worried about the physical problems that I cannot think of anything else	34 (10.73)	18 (5.90)
I have not noticed any recent change in my interest in sex.	45 (14.20)	53 (17.38)
I am less interested in sex than I used to be.	18 (5.68)	16 (5.25)
I have almost no interest in sex.	128 (40.38)	137 (44.92)
I have lost interest in sex completely.	126 (39.75)	99 (32.46)
Total score (mean, SD) Actual range 0-44	18.53 (10.23)	13.54 (8.92)

5.2.2: Association between depressive symptoms, predisposing, enabling and need factors (n=317)

This section describes participants' characteristics based on depressive symptoms (See Table 5.5). The results indicate that based on the violence index scale, participants in the depression category reported high exposure to violence on average compared to participants in the non-depressive category (4.64 vs. 3.62, $P<.001$). In the same way, compared to participants in the non-depressive category, participants in the depressive category reported lower levels of social support (109.49 vs. 121.16, $P<.001$). Additionally, participants in the non-depressive category were more likely to own tangible assets compared to participants in the depressive category (11.45 vs. 10.71, $P<.05$). All other factors were not statistically different.

Table 5.5. Association between depressive symptoms, predisposing, enabling and need factors (n=317)

Variables	No depressive symptoms (n=188) n (%) or mean [95% CI]	Depression sub-group (n=129) n (%) or mean [95% CI]	Design Based F	P
<i>Predisposing factors</i>				
Age (years)	15.38 [15.10, 15.66]	15.44 [15.09, 15.79]	0.46	.498
No. of adults in the family	7.12 [6.56, 7.66]	7.19 [6.79, 7.60]	0.07	.789
No. of children	3.63 [3.25, 4.00]	3.65 [3.08, 4.22]	0.01	.927
Exposure to violence index	3.62 [3.25, 3.98]	4.64 [4.30, 4.99]	11.46	<0.001
<i>Residence</i>			1.78	.208
Urban	72 (38.3)	39 (30.2)		
Rural	116 (61.7)	90 (69.8)		
<i>Orphanhood status</i>			1.24	.288
Orphans	34 (18.09)	30 (23.26)		
Non-orphans	154 (81.91)	99 (76.74)		
<i>Enabling factors</i>				
Social support from multiple sources	121.16 [118.28, 124.03]	109.49 [105.82, 113.16]	46.59	<0.001
Household asset index	11.45 [10.89, 12.01]	10.71 [10.21, 11.21]	4.89	0.03
<i>Distance to the school</i>			0.8761	0.3694
Near (0-2 kms)	98 (52.1)	75 (58.1)		
Far (over 2 kms)	90 (47.9)	54 (41.9)		

5.4. Aim 3: Latent Class Solutions

Latent class models were run to address aim 3 of the study, describing the patterns of mental health service utilization and exploring how predisposing, enabling, and need factors are associated with mental health service utilization among school-going adolescent girls in southern Uganda. Aim 3 of the study is based on four specific hypotheses. The first hypothesis (H3a) sought to examine distinct patterns of mental health service utilization among school-going adolescent girls. The second hypothesis (H3b) examined whether predisposing factors (age, family size, number of children in the family, and residence) were associated with a lower likelihood of mental health service utilization among school-going adolescent girls. The third hypothesis (H3c) examined whether enabling factors (family assets, quality of social support relationships, and distance to the school) were associated with a higher likelihood of mental health service utilization among school-going adolescent girls. Lastly, the fourth hypothesis (H3d) examined whether need factors (depressive symptoms) were associated with a higher likelihood of mental health service utilization among school-going adolescent girls.

The results for fit statistics for class solutions 1 through 4 are illustrated in Table 5.6. An examination of the results indicated that the two-class model yielded the best-fit indices and was selected as the best solution because it showed a higher entropy (0.981), had a good AIC (AIC=4122.065), acceptable classification quality, and informative theoretical meaningfulness. Based on the theoretical model (Andersen, 1995) guiding this work, healthcare utilization is measured as a binary outcome considering those who use the services and those who do not use the services. (Also see Azfredrick, 2016; Babitsch et al., 2012). In addition, a breakdown showing the estimated class membership of the participants in each of the LCA class solutions is presented in table 5.7. The two patterns of mental health utilization identified in the selected two-

class model were “low attendants” (Class 1, 29.6%), and “high attendants (Class 2, 70.4%).

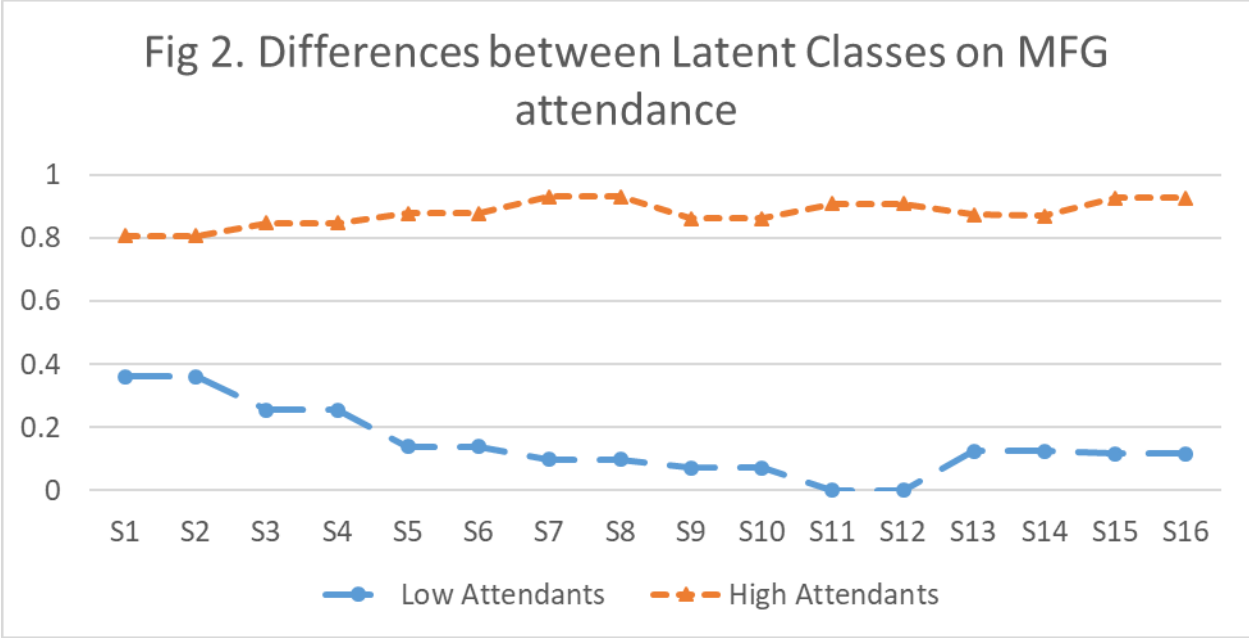
These two classes are visually represented in figure two indicating high attendants—orange line and low attendants—blue line across 16 sessions. Although the four-class model had the best AIC (AIC=3532.176) and higher entropy (0.98), it includes a class with a small number of cases (n = 31), which would create cells with insufficient numbers of cases in the subsequent analyses. Therefore, I choose the two-class solution and hypothesis H3a indicating that there were distinct patterns of mental health service utilization among school-going adolescent girls was supported.

Table 5.6. Latent Class Analysis fits statistics (n=317)

Class	AIC	BIC	Sample-size adjusted BIC	Entropy	LMR p-value
1	6510.275	6570.417	6519.669	–	–
2	4122.065	4246.108	4141.44	0.981	< 0.001
3	3742.939	3930.884	3772.296	0.977	< 0.05
4	3532.176	3784.023	3772.296	0.98	0.289

Table 5.7. Breakdown of Latent Classes of mental health utilization (n=317)

Class Solutions	Estimated membership (%)	Estimated membership (%)	Estimated membership (%)	Estimated membership (%)
One class	100.0%	29.6%	44.0%	21.0%
Two classes	-	70.4%	29.0%	44.0%
Three classes	-	-	27.0%	13.0%
Four classes	-	-	-	22.0%



5.4.1. Association between patterns of mental health utilization, predisposing, enabling, and need factors (n=317)

Predisposing factors.

The results in this section describe the association between predisposing, enabling, and need factors and patterns of mental health utilization (Table 5.8). Findings indicate that about three-quarters of the study participants were high attendants (n=224, 70.4%). High attendants lived in large families compared to low attendants, with an average of seven adults in high attendants class compared to six adults in the low attendants class ($P<.05$). In the same way, the high attendants class reported living in families with a high number of children compared to the low attendants class (3.77 vs 3.31 , $P<.001$). Additionally, the majority of the participants (64.7%) in the high attendants class reported living in rural-based schools and were mostly non-orphans—lived with both parents (82.6%), but both differences were not statistically significant.

Enabling factors

As indicated in Table 5.8, none of the enabling factors were statistically different between the low attendants' and high attendants' classes. For example, the social support from multiple sources index score (116.71 vs. 116.29 , $P=.817$) and the asset ownership (11.16 vs. 11.14 , $P=.944$) between the low attendants and high attendants participants. Similarly, the majority of the participants (55.8%) that reported living within walking distance of their schools (0-2 kilometers) were in the high attendants' class compared to participants who lived more than two kilometers from the school (44.2%, $p=.362$).

Need factors

Participants in the low attendants class reported a higher average score on the depression score compared to participants in the high attendants class (19.29 vs. 18.21). However, this difference was not statistically significant ($p = 0.4177$).

Table 5.8. Association between patterns of mental health utilization, predisposing, enabling, and need factors (n=317)

Variables	Low attendants (n=93) n (%) or mean [95% CI]	High attendants (n=224) n (%) or mean [95% CI]	Design Based F	P
<i>Predisposing factors</i>				
Age (years)	15.43 [15.06, 15.79]	15.40 [15.11, 15.68]	0.15	0.7015
No. of adults in the family	6.72 [6.24, 7.21]	7.32 [6.88, 7.76]	4.07	0.0437
No. of children	3.31 [2.92, 3.71]	3.77 [3.35, 4.19]	11.80	<0.001
Exposure to violence index	4.28 [3.88, 4.67]	3.93 [3.51, 4.35]	1.33	0.2481
<i>Residence</i>			0.0342	0.8567
Urban	32 (34.4)	79 (35.3)		
Rural	61 (65.6)	145 (64.7)		
<i>Orphanhood status</i>			3.5481	0.0863
Orphans	25 (26.8)	39 (17.4)		
Non-orphans	68 (73.2)	185 (82.6)		
<i>Enabling factors</i>				
Social support from multiple sources	116.71 [113.69, 119.73]	116.29 [112.70, 119.87]	0.05	0.8174
Household asset index	11.16 [10.44, 11.88]	11.14 [10.74, 11.54]	< 0.001	0.9438
<i>Distance to the school</i>			0.9065	0.3615
Near (0-2 kms)	48 (51.6)	125 (55.8)		
Far (over 2 kms)	45 (48.4)	99 (44.2)		
<i>Need factors</i>				
Depressive symptoms	19.29 [16.59, 21.99]	18.21 [16.65, 19.78]	0.66	0.4177

5.4.2. Hierarchical logistic regression results

Guided by the Andersen model of healthcare utilization (Andersen, 1995), this section address three hypotheses embedded in Aim 3 as described in section 5.3. These include, H3b) examining whether predisposing factors (age, family size, number of children in the family, and residence) were associated with a lower likelihood of mental health service utilization among school-going adolescent girls; H3c) examining whether, enabling factors (family assets, quality of social support relationships, and distance to the school) were associated with a higher odds of mental health service utilization among school-going adolescent girls; and H3d) examining whether need factors (depressive symptoms,) were associated with a higher odds of mental health service utilization among school-going adolescent girls. Therefore, I present results from the adjusted and unadjusted logistic regression analyses testing the associations between predisposing, enabling, need factors, and classes of attendants (see Table 5.9). In unadjusted models, two predisposing factors were significantly associated with classes of attendants. Specifically, for each additional adult in the household, the odds of being in the high attendants class increased by a factor of .08 ($P < .05$). In addition, for every additional young child in the family, the odds of being in the high attendants class were 12% higher compared to those in the low attendants class ($OR = 1.12$, $95\% CI = 1.05, 1.19$, $P < .001$). This finding is contrary to the hypothesized relationship that predisposing factors were associated with a lower likelihood of mental health service utilization. In the adjusted models examining the association between predisposing, enabling, need factors, and classes of attendants, no statistically significant results were observed. Therefore, all the hypothesized relationships H3b through H3c were not supported.

Table 5.9. Hierarchical logistic regression on predisposing, enabling, and need factors predicting patterns of mental health utilization among school-going adolescent girls (n=317)

Variables	Unadjusted	Adjusted model 1: Predisposing factors	Adjusted model 2: Predisposing + Need factors	Adjusted model 3: Predisposing + Need + Enabling factors
	OR [95% CI]	OR [95% CI]	OR [95% CI]	OR [95% CI]
<i>Predisposing factors</i>				
Age (years)	.96 [.78, 1.19]	.96 [.77, 1.19]	.96 [.77, 1.21]	.94 [.76, 1.17]
No. of adults in the family	1.08 [1.00, 1.17]*	1.04 [.93, 1.15]	1.04 [.94, 1.15]	1.05 [.93, 1.19]
No. of children	1.12 [1.05, 1.19]***	1.08 [.96, 1.21]	1.08 [.96, 1.21]	1.08 [.94, 1.23]
Exposure to violence index	.95 [.86, 1.04]	.94 [.85, 1.04]	.94 [.84, 1.05]	.93 [.84, 1.03]
<i>Residence (ref: Urban)</i>				
Rural	1.04 [.69, 1.55]	1.06 [.70, 1.60]	1.05 [.71, 1.57]	1.05 [.69, 1.59]
<i>Orphanhood status (ref: non-orphans)</i>				
Orphans	1.74 [.97, 3.12]	1.66 [.89, 3.08]	1.64 [.88, 3.05]	1.63 [.86, 3.07]
<i>Need factors</i>				
Depressive symptoms	.99 [.97, 1.01]	-	.99 [.97, 1.02]	.99 [.96, 1.02]
<i>Enabling factors</i>				
Social support from multiple sources	.99 [.98, 1.01]	-	-	.99 [.98, 1.01]
Household asset index	.99 [.94, 1.06]	-	-	.97 [.92, 1.03]
<i>Distance to the school (ref: Near (0-2 kms)</i>				
Far (over 2 kms)	.84 [.59, 1.19]	-	-	.84 [.59, 1.19]

5.5. Aim 4: SEM framework findings

To address aim 4 of this dissertation, which explores pathways between predisposing, enabling, and need factors and how the pathways vary by mental health service utilization, I ran a series of Pearson and biserial correlations to identify which variables to include in the SEM model (see Table 5.10). Correlations indicate that increase in the number of adults in families was associated with having more children below 18 years ($r=0.639$, $P<.001$). In the same way, having more tangible assets was correlated with more adults in the household ($r=0.212$, $P<.01$), having more children ($r=0.148$, $P<.001$), and exposure to physical and emotional violence ($r=-0.135$, $P<.05$). Exposure to emotional and physical violence, on the other hand, was correlated with low social support ($r=-0.230$, $P<.05$) and depressive symptoms ($r=0.228$, $P<.05$). Social support was inversely associated with depressive symptoms ($r=-0.432$, $P<.01$). None of the predictors were associated with the main outcome—patterns of mental health utilization.

Table 5.10. Correlation matrix of the predisposing, enabling, need factors and patterns of mental health utilization (n=317)

	1	2	3	4	5	6	7	8	9	10	11
1 Age	1										
2 Number of Adults	-0.015	1									
3 Number of Children	-0.002	0.639*	1								
4 Residence Exposure to violence	-0.046	-0.089	-0.108	1							
5 Orphanhood	-0.038	0.035	0.109	-0.067	1						
6 Household asset index	-0.017	0.060	0.102	0.023	0.004	1					
7 Distance to School	-0.038	0.212*	0.148*	-0.006	-0.135*	0.076	1				
8 Perceived social support	0.003	0.124*	0.117*	-0.112*	0.023	-0.094	0.095	1			
9 Depression score	-0.121*	-0.016	-0.024	0.118*	-0.230*	0.017	0.084	0.042	1		
10 Patterns of mental health utilization	0.030	0.024	-0.042	-0.078	0.228*	-0.075	-0.095	-0.036	-0.432*	1	
11	-0.017	0.094	0.102	0.008	-0.0638	0.107	-0.003	-0.038	-0.012	-0.048	1

* $P < .05$

5.5.1. Pathways from predisposing factors to depressive symptoms through the quality of social support relationships.

This section answers aim 4 of this dissertation, which examines the direct and indirect pathways between predisposing (age, residence, number of adults, and exposure to violence), and need factors (depressive symptoms) and how these differ by attendance patterns. Based on the theoretical model guiding this work, the following hypotheses are specified H4a) there is a direct relationship between predisposing factors (age, residence, number of adults, and exposure to violence) and need factors (depressive symptoms). H4b) there is an indirect relationship between predisposing (age, residence, number of adults, and exposure to violence) and needs factors (depressive symptoms), through enabling factors (quality of social support relationships) and H4c) the hypothesized indirect effect varies by patterns of mental health utilization.

Structural equation modeling with observed variables was conducted to examine the direct and indirect relationships between predisposing factors and need factors across patterns of attendance. The model adjusted for covariates (age and number of adults in the family). The model yielded good model fit indices (CFI = 0.97; SRMR = 0.041; non-significant model chi-square was $\chi^2(4) = 7.11$, $p = .130$, RMSEA = 0.070 (90% CI: 0.000-0.152). I present standardized betas for the SEM results.

To address hypotheses H4a and H4b specified above, I found that there was no direct relationship between a participant's residence and their quality of social support relationships for both low attendants ($\beta = 0.03$, $p = 0.74$) and high attendants ($\beta = 0.12$, $p = 0.18$). Quality of social support relationships was directly associated with depressive symptoms for both low attendants ($\beta = -0.36$, $p < .001$) and high attendants ($\beta = -0.42$, $p < .001$). I did not find any relationship between participants' residence and depressive symptoms as well as participants' residence and

quality of social support relationships for both low and high attendant groups (see Figure 2 and 3); therefore, the hypotheses H4a and H4b examining the direct and indirect effect between predisposing, enabling and need factors were not supported. Similarly, hypothesis H4c hypothesizing that the indirect effect varies by patterns of mental health utilization was not supported because there was no significant indirect effect.

Exposure to violence: This section addresses three hypotheses, which are: H4a) there is a direct relationship between predisposing factors (age, residence, number of adults, and exposure to violence) and need factors (depressive symptoms), H4b) there is an indirect relationship between predisposing (Age, residence, number of adults, and exposure to violence) and needs factors (depressive symptoms), through enabling factors (quality of social support relationships) and H4c) the hypothesized indirect effect varies by patterns of mental health utilization.

Results indicate that adolescent girls' exposure to violence reduces the quality of social support relationships for high attendants ($\beta = -0.42, p < .001$) but not for the low attendants' group ($\beta = -0.13, p = .12$) and is associated with an increase in depressive symptoms for the high attendants ($\beta = 0.15, p < .05$) and not for the low attendants' group ($\beta = -0.12, p = .27$) (see Figure 2 and 3). In addition, quality of social support relationships was directly associated with a decrease in depressive symptoms for both low attendants ($\beta = -0.36, p < .001$) and high attendants ($\beta = -0.42, p < .001$). I did not find any relationship between participants' exposure to violence and quality of social support relationships. Hence, in the low attendants' H4a and H4b were not supported. Since exposure to violence was associated with increase in depressive symptoms ($\beta = 0.15, p < .05$), within the high attendants' group, hypothesis (H4a) (i.e., that there is a direct relationship between predisposing factors - age, residence, number of adults and exposure to

violence - and need factors - depressive symptoms- was supported. Moreover, in the high attendants' group, a partially mediated hypothesis (H4b) that quality of social support relationships will mediate the relationship between exposure to violence and depressive symptoms was supported (indirect effect: $\beta = 0.11$, $p < .001$). Overall, hypothesis H4c hypothesizing that the indirect effect varies by attendance patterns was also supported because there was no observed indirect effect in low attendants compared to the partially mediated model in the high attendants' group.

Using MacKinnon's formula (Preacher, & Kelley, 2011) for calculating the mediated effect size, findings indicated that quality of social support relationships explained 43% of the mediation, which falls within the medium effect size range (Cohen, 1992).

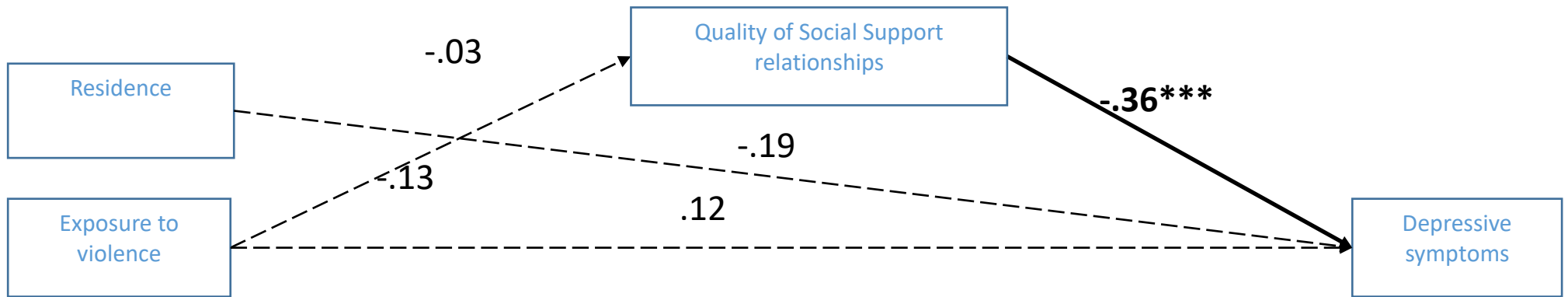


Figure 3: Low attendants group (N=93).

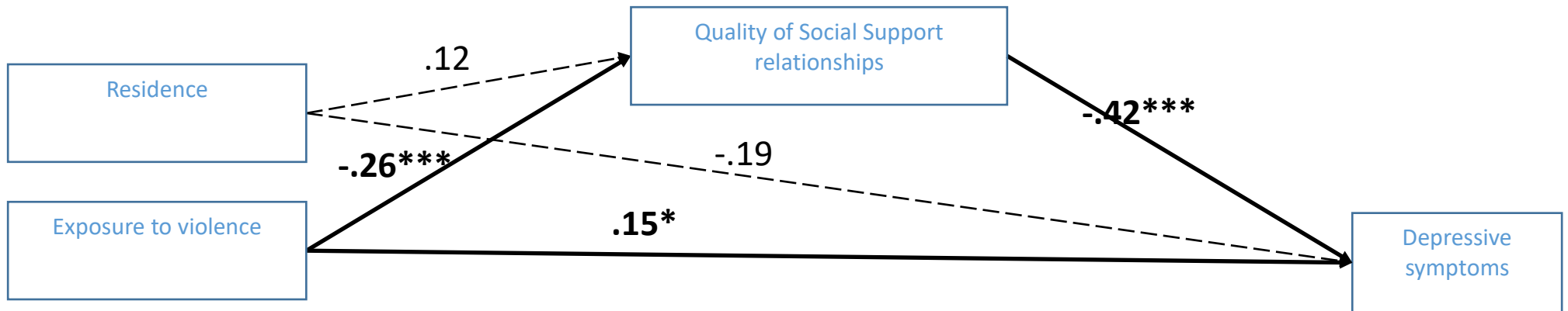


Figure 4: High attendants group (N=224).

Figure 3 and 4. Hypothesized class-attendant pathways between residence and exposure to violence to quality of social support relationships and depressive symptoms among Adolescent girls in Uganda.

Note: standardized coefficients; $*p < .05$, $**p < .01$; $***p < .001$

Chapter 6: Discussion

Introduction

The aims of this study were four-fold. First, the study examined the short-term effect of a multiple family group intervention to alleviate depressive symptoms among 1260 adolescent girls. Although this was an exploratory aim and therefore, no assumptions were made, the results indicate that at 12-months post-intervention initiation, the intervention was effective in reducing depressive symptoms between the treatment and control conditions. To address aim two through four, this study specifically looked at a sub-group of the sample (n=317) that participated in the multiple family group intervention set across 12 public secondary schools. The second aim sought to determine depressive symptoms among adolescent girls during school transition. This aim was based on a hypothesis that transitions – and especially academic levels transitions – can be stressful and hence associated with elevated depressive symptoms. However, the findings indicated that at 12-months post-intervention initiation, participants had a significant decline in depressive symptoms compared to the baseline. Furthermore, to identify potential risk and protective factors, I conducted bivariate analyses describing predisposing and need factors between participants with elevated depressive symptoms and non-depressive symptoms. This study found that exposure to violence, low levels of asset ownership, and low quality of social support relationships were risk factors for depressive symptoms.

In addition, a latent class model was conducted to examine patterns of mental health utilization using individual-level attendance data from the sixteen sessions of the multiple family group intervention. Two patterns of mental health utilization were identified including low attendants and high attendants. Based on the Andersen model of health care utilization, the patterns of mental health utilization were regressed on predisposing, enabling, and need factors to identify factors associated with high attendance to the multiple family group. In this study,

family-level factors were critical in influencing high attendance. Lastly, a structural equation model was conducted to examine the direct and indirect pathways between predisposing, enabling, and need factors across patterns of mental health utilization. In this study, enabling and predisposing factors were directly associated with need factors. Similarly, an indirect relationship mediating the relationship between predisposing and need factors through enabling factors was observed. Specifically, the study found that the quality of social support relationships mediated the relationship between exposure to violence and depressive symptoms. This relationship was different for participants in the low attendants' group compared to participants in the high attendants' group indicating the effect of the MFG intervention in enhancing social support among intervention participants.

Therefore, this section presents possible explanations for the impact of the intervention on depressive symptoms, and why predisposing, need and enabling factors were not associated with patterns of mental health utilization, and the mediating role of social support. Furthermore, major findings and their implications for programming and policy, along with the limitations of the current study and implications for further research, are discussed.

6.1. Discussion of findings

The short-term impact of an evidence-based intervention—the multiple family group intervention on depressive symptoms

In low-resource environments, the strategy of moving tasks from skilled professionals to non-specialized or lay workers is known as "task-shifting" (Healy et al., 2018; Kakuma et al., 2011). This strategy has been widely supported by the global mental health movement as a solution to the mental health treatment gap in many LMICs. Importantly, the results from this

study add to the existing literature on task-shifting. As earlier indicated, the intervention was facilitated by trained community health workers and parent peers. The facilitators received training for 1 day and received ongoing supervision during every session. The training was provided over a short period because the facilitators were already familiar with the same intervention delivered to children ages 8-11 years. This was provided by trained research assistants that attended all sessions to ensure fidelity of the delivery. This is very critical in many low resource settings because having very limited mental health professionals like social workers, psychiatrists, and psychologists is one of the largest barriers to scaling up mental health interventions in SSA (Ssebunya et al., 2010; Kakuma et al., 2011). As a result, the majority of young people suffering from mental disorders are either undiagnosed or lack access to mental health services. For example, studies indicate that in most SSA countries there is one psychiatrist to 4 million people (Kohrt & Mendenhall, 2016). As a result, untreated mild depressive symptoms might persist and progress to clinical depression, which has the potential to negatively impact the health and wellbeing of adolescents.

Consistent with prior research interventions delivered by lay community health workers in low-resource settings led to improvement in depressive symptoms among participants (Bolton et al., 2007; Nakimuli-Mpungu et al., 2015; Huang et al., 2014). Specifically, Bolton and colleagues evaluated the impact of a group psychotherapy intervention among 314 adolescent girls in Northern Uganda and found that after 16 weeks, adolescent girls in the intervention had a 13% decline in depressive symptoms compared to the control group. Similarly, in a recent systematic review involving 14 studies focused on task-shifting, Galvin and Byansi (2020) found that existing studies yielded several encouraging results. Particularly, the vast majority of task-shifting efforts yielded positive findings in the desired direction, indicating that these programs are generally effective in enhancing mental health outcomes overall. Therefore, task shifting

might be best suited for the treatment of adolescent mental health issues in Sub-Saharan Africa due to the general lack of specialized health services in many countries. It also provides an alternative to solving the human resource shortage that plagues most Sub-Saharan African countries. As a study yielding an effective task-shifting MFG intervention, this study further contributes to this literature.

Risk and protective factors for depression

In this study, participants reported elevated symptoms at baseline ($M=18.53$, $SD=10.23$). Similarly, about 41% of adolescent girls experienced mild to severe symptoms based on the recommended cut-off of 20 (Beck, Steer, & Brown, 1996). This finding is consistent with previous research indicating that depression is highly prevalent among adolescents and is one of the leading causes of disability. For instance, a recent systematic study found that one in every five children in SSA experience a mental health problem, with prevalence rates ranging from 2.7 percent to 25 percent across studies (Cortina, Sodha, Fazel, & Ramchandani, 2012). Moreover, this review further found that emotional disorders, such as depression and anxiety disorders, as well as conduct, aggressive, and reactive behavior disorders, and posttraumatic stress disorder, were the most frequently diagnosed disorders.

Similarly, more recently, Yatham and colleagues (2018) conducted a systematic review to examine the prevalence of depressive symptoms among youth in LMICs including countries in SSA. The study found that depression was highly prevalent with rates of up to 28% among youth. The few available prevalence studies in Uganda have estimated up to 29.3% prevalence rates of depression in the general population (Bolton et al., 2004; Ovuga et al., 2005; Kinyanda et al., 2011). In addition, studies have discovered that being a female is associated with an elevated risk of depression (Kinyanda et al., 2011). These high rates are not surprising especially because

most studies use screen measures, which generally yield high estimates compared to clinical/diagnostic tools. Moreover, due to a history of colonialism and conflict, the 48 countries of Sub-Saharan Africa account for the largest proportion of the world's poorest countries, have undergone significant social tensions and armed conflict, and currently have the highest rates of human immunodeficiency virus/AIDS (UNAIDS, 2020). Yet, existing research indicates that children's basic physical, cognitive, and social growth can be negatively affected by adverse childhood circumstances, putting them at risk for psychological disorders (Grantham-McGregor et al., 2007; Rudolph, & Flynn, 2007; Mall et al., 2018). This research adds to existing literature indicating high need for mental health services.

Furthermore, the experience and manifestation of mental health symptoms as well as the risk factors seem to be influenced by gender. For example, girls are more likely to report mental health issues than their male counterparts (Nolen-Hoeksema, 2002; Petroni et al., 2015). In this study, the results indicate that high exposure to violence, low asset ownership in the family, and low quality of social support are associated with an increase in depressive symptoms among adolescent girls. These results are consistent with known risk factors for depression for adolescents in low resource settings, most importantly among adolescent girls who are most vulnerable in these contexts. First, poverty constitutes both a stressor and a severe barrier to access mental health services. Considerable research (Patel & Kleinman, 2003; Patel et al., 1998; Karimli et al., 2019; Lund et al., 2011) has documented that a reciprocal relationship between poverty and mental health exists.

Poverty is a significant risk factor for mental illness because it induces emotional distress, which can lead to the development of serious mental health problems. In many low-resource settings with a high number of poor and unemployed people, especially those with low education, people are more likely to use alcohol and other illegal substances to cope with their

life and social challenges, making them more vulnerable to mental health problems. Therefore, it is not surprising that poor people are more likely to associate with people of similar social-economic status and as such can hardly get support and assistance. Indeed, prior research has shown that low-income and disadvantaged people frequently obtain inadequate social support, owing to their social networks being made up of people in similar socioeconomic situations (Harknett & Hartnett, 2011; Henly, Danziger, & Offer, 2005).

Poverty exposes children to several mental and physical health risks. The lack of protective factors in vulnerable children's families and neighborhoods increases the risk of mental health issues and developmental disabilities (Durkin, 2002; Richter, 2003). As a result, poverty raises the likelihood of mental health issues in children and adolescents (Murali & Oyebo, 2004). Furthermore, the multiplier effect of poverty can be observed beyond the individual. For example, Patel and Kleinman (2003) conducted a systemic review of studies from LMICs in Africa, Asia, and Latin America and found that poverty limits individuals' involvement in the educational and employment systems, which were both associated with an increase in mental illnesses.

Moreover, poverty affects help-seeking behaviors because patients may not be able to afford to travel to health facilities, particularly if they are located in remote areas. Consistently, prior work in this area indicates that poor people live in areas far away from places where help is available. Therefore, it is difficult for people to spend their limited funds on medical treatment until their symptoms worsen. Poor people might place a higher priority on their physical health than their mental health and defer seeking mental health care hence maintaining the vicious cycle of mental illness and poverty. Since most adolescent girls are not of working age, the lack of resources in the family impacts their ability to access needed resources including school fees, sanitary towels, food, and medical care, which might increase stressors that ultimately are

detrimental to health and wellbeing. When one's basic needs aren't met, he or she is more likely to suffer from health problems, including extreme psychological distress when confronted with stressors.

In many low-resourced settings including countries in SSA, exposure to violence is a frequent phenomenon (Muluneh et al., 2020; Stark et al., 2020; Kågesten et al., 2016; Seff et al., 2020). This can occur at school, within the family, and in the community. Participants in this study reported exposure to violence relating to physical and emotional violence including beating, slapping, and verbal abuse. In many SSA contexts, adolescent girls are expected to adhere to gender norms and are likely to experience enormous pressure from parents, friends, and portrayals in the media. Children and adolescents in Uganda live in impoverished neighborhoods with high rates of domestic violence (30%) and physical violence (80%) (Naker, 2005; Koenig et al., 2003). In a study among adolescent girls, Kgesten and colleagues (2016) found that they overwhelmingly endorse gender inequality-perpetuating norms. Girls more than boys are more likely to undergo forced sexual initiation, violence, drop out of school, and early marriage, putting them at risk for early pregnancies, maternal and infant mortality, and HIV and other sexually transmitted infections (Kapungu & Petroni, 2017; Stark et al., 2020). Thus, a combination of risk factors with puberty-related biological, emotional, and cognitive processes (Albert, 2015; Patton et al., 2016), increases the risk of depression and other mental health disorders among adolescent girls. Therefore, any evidence-based practice that is being considered for adolescent girls must take into account poverty and family economic capabilities, family and community protection, as well as health and mental health co-morbidities.

The finding that low social support relationships were associated with depressive symptoms is consistent with existing literature suggesting that having depressive symptoms reduces ones' ability to seek support. This could be due to several factors, including lack of

access to resources, limited knowledge about existing services, prejudice, and stigma associated with having a mental illness in many communities in SSA and Uganda in particular.

Furthermore, adolescents might face discrimination and stigma from extended family members, which can lead to a negative self-image and a lack of kin-based social support, further isolating them. Therefore, since mental health care providers are scarce, it might be useful for adolescents with mental health issues to seek social support from peers, teachers, parents, and friends.

Prior studies argue that adolescence is a crucial time for developing one's agency including building self-esteem, self-efficacy, and stability of the self (Whitlock, Wyman, & Moore, 2014), which enhances adolescent's ability to seek support. For instance, a study among 961 adolescents in Australia examined the reciprocal relationship between self-esteem and social support and found that adolescents with a high self-concept were more likely than those with a low self-concept to seek help when they were distressed (Marshall et al., 2014).

Furthermore, social support should be carefully considered in the context of adolescents living in HIV-endemic regions like SSA because adolescents with a mental health challenge might be bullied and stigmatized. This might make many adolescents self-isolate and not seek out support, which in turn, might increase their depressive symptoms. For example, Sharer and colleagues (2016) examined the association between the quality of social support and how it relates to depression, anxiety, and post-traumatic stress among 1,380 South African adolescents (ages 10-17) orphaned by AIDS and/or living with an AIDS-affected family member. They discovered that emotional support was most often linked to depression. Surprisingly, higher levels of emotional support from siblings were linked to the adolescent experiencing more depressive symptoms, while higher levels of emotional support from parents were linked to fewer depressive symptoms (Sharer et al., 2016). Thus, for adolescent girls, it is critical to build

interventions that bolster individual agency and adolescents' social connections that might help alleviate adolescent depression.

Patterns of mental health utilization

Using a data-driven approach, two patterns of mental health utilization were developed from individual-level attendance data from sixteen sessions of the multiple family groups. Out of the 317 adolescents that participated in the intervention, 70% were categorized as high attendants and 30% as low attendants. Based on this theoretical model underpinning this dissertation, I hypothesized that there will be distinct patterns of mental health service utilization among school-going adolescent girls. Therefore, the two-class model yielded adequate classification quality and informative theoretical meaningfulness. Healthcare utilization is measured as a binary outcome considering those who use the services and those who do not use the services, according to the theoretical model (Andersen, 1995; Azfredrick, 2016; Babitsch et al., 2012) that guides this research. This is in line with previous studies in SSA, which looked at whether people received treatment from a public or private hospital, as well as whether they sought care from conventional, religious, and other types of healers (Abera Abaerei, Ncayiyana, & Levin, 2017; Azfredrick, 2016). In addition, on average participants attended 10 sessions ($M=10.6$, $SD=5.9$) indicating that there was high engagement with the intervention.

Several reasons could potentially explain the high level of attendance among adolescent girls in the multiple family group intervention. First, the study team is highly engaged in the community, is well recognized, and collaborates with community-based institutions including the church, schools, and local political leaders in the Masaka region. This builds trust and support for the community to engage and actively participate in the intervention. Secondly, the success of the intervention speaks to the good adaptation of the intervention within the context of Uganda.

Community stakeholders in Uganda including church leaders, teachers, parents, and students reviewed the intervention. Students in secondary schools were invited to draw cartoons to be included in each of the sessions.

Similarly, the stakeholders developed age and culturally appropriate intervention activities that were completed by families. This is consistent with prior research suggesting that successful interventions have to be well-adapted to suit the local context, which enhances acceptability and uptake of the intervention (Hirschhorn, Ojikutu, & Rodriguez, 2007; Wittkowski, et al., 2014; Sensoy Bahar, et al., 2020). Adapting evidence-based interventions requires careful consideration of the cultural nuances of what is acceptable and not acceptable as well as the community sanctioned institutions like the church. This is because interventions that conflict with such institutions can face stiff opposition and given that the majority of people believe in the church, such opposition might fail even a well-intentioned intervention. Indeed, concerns have been raised about EBIs' cultural blindness and lack of responsiveness to community contexts, which has resulted in lower levels of acceptance and participation, adversely affecting program outcomes (Devieux et al., 2005).

Furthermore, the intervention organization and delivery within the community at schools was consistent with the existing literature suggesting that mental health interventions should be delivered within existing institutions (Huang et al., 2014). The multiple family group intervention was delivered at the school and all families were reimbursed for transportation costs to eliminate the barriers associated with transport. Similarly, public schools are based within the community and easily accessible by many parents and or caregivers. Prior research has argued that school-based interventions are essential in many settings because they provide an avenue for a broader reach to students/adolescents (Huang et al., 2014; Kinsman, et al., 2001). Similarly, schools are more likely to potentially have more stable funding from the government and a

variety of professionals that could support the intervention (e.g., teachers, staff, nurses, counselors), a well-established organizational structure, and the ability to scale up interventions with a wide reach (Huang, Cheng, & Theise, 2013).

In addition, Schools have a central role in the care and support for adolescents by applying innovative evidence-based care and support frameworks and models to address inequality and health disparities (Kinsman, et al., 2001). For example, Kinsman and colleagues (2001) examined the design, and implementation of a 19 activity extracurricular school-based AIDS education program in southwestern Uganda working with trained teachers. In the Uganda context, teachers, counselors, and nurses can be trained to assess for symptoms of depression as well as to deliver brief interventions and refer adolescents to specialized care in case of severe clinical cases. Nevertheless, school-based interventions are based on the assumption that all adolescents are enrolled in school. Yet, many adolescents in low-resource settings drop out of school due to lack of tuition costs or the death of parents. Therefore, this implies that the majority of adolescents not in school might miss mental health interventions.

Association between patterns of mental health utilization, predisposing, enabling, and need factors

For this section, several theoretically informed (Andersen, 1995) hypotheses were examined to identify whether predisposing, enabling, and need factors were associated with patterns of mental health utilization. Three different hypotheses guided the results including H3b) Predisposing factors will be associated with a lower likelihood of mental health service utilization among school-going adolescent girls; H3c) enabling factors will be associated with a high likelihood of mental health service utilization among school-going adolescent girls, and

H3d) Need factors (depressive symptoms,) will be associated with a high likelihood of MH service utilization among school-going adolescent girls.

I found that two predisposing factors, the number of adults in the household and the number of children were significantly associated with high utilization of mental health services. Specifically, every additional adult in the household was associated with an increase in attendance. Similarly, every additional young child in the family was associated with high attendance. There were no statistically significant findings in the final adjusted model analyzing the relationship between predisposing, enabling, need factors, and patterns of mental health utilization. As a result, none of the hypothesized relationships H3b through H3c were supported. Given that the intervention was organized in a way that eliminated many of the barriers to attendance including transport and distance, it is no surprise that theoretical concepts based on formal health systems did not hold. For example, studies have shown that people in rural areas face obstacles to receiving health services due to a lack of transportation infrastructure (Molodynski et al., 2017; Roberts et al., 2018; Patton et al., 2016). In addition to transport facilitation, the schools were located in the community and as such easily accessible to many families in the intervention. Only family-level factors were the most relevant to a community-based intervention because the intervention allowed more than one family member to attend. In the same way, having adult family members provides childcare that can facilitate other family members to attend the intervention. Children in the Uganda context can and do provide childcare in the absence of parents and caregivers. This also speaks to the connection and acceptability the families have towards the intervention. Indeed, acceptability seems to be an important dimension in explaining the utilization of the multiple family group intervention. In fact, in many areas in SSA and Uganda in particular, communities hugely engage with trusted traditional systems of care. For example, research from SSA indicates that people with mental illnesses are likely to

seek care from less stigmatizing places including school and community health centers (Huang et al., 2014).

Limited research in this context suggests that age, type of health care facility, and feelings of inadequacy were key predictors of health care utilization among adolescent girls in Nigeria (Azfredrick, 2016). Schierenbeck and colleagues (2013) found that lack of staff, and facilities at community services, and preventive care greatly limited access to mental health services. However, these studies were conducted in informal healthcare settings and lacked the same planning and organization involved in the multiple family group intervention. Therefore, some of the core tenets of Andersen's model of health care utilization do not directly apply to community-based mental health settings.

Quality of social support relationships as a mediator between predisposing factors and need factors.

This section answers four theoretically informed hypotheses, including H4a) there is a direct relationship between predisposing factors (age, residence, number of adults, and exposure to violence) and need factors (depressive symptoms), H4b) there is an indirect relationship between predisposing (age, residence, number of adults, and exposure to violence) and needs factors (depressive symptoms), through enabling factors (quality of social support relationships) and H4c) the hypothesized indirect effect varies by patterns of mental health utilization.

First, after controlling for participants' age, number of adults, and exposure to violence, the study found no direct relationship between participants' residence and depressive symptoms as well as social support relationships for participants in both the low attendants and high attendants' group. In this case, all hypotheses H4a through H4c were not supported. Although some of our participants were in rural and others in urban schools, the schools were matched at

randomization on several variables. Therefore, this finding is not surprising because public schools in low-resource settings tend to have similar student demographics. Although no direct relation was found between residence and depressive symptoms, I found the hypothesized direct relationship indicating that the quality of social support relationships was associated with lower levels of depressive symptoms in the low attendants' group. This could imply that the intervention builds social support among family members and adolescents as they share their experiences in the group. Adolescents likely develop social connectedness with one another, which is critical to deal with life stressors. Understanding the connection between social support and depression is critical for designing strategies that effectively reduce depression among adolescents in SSA.

Several prior cross-sectional studies among adolescents living with HIV and AIDS-affected adolescents in SSA have identified social support as a predictor of depression. Specifically, social support was found to be associated with lower levels of depression in orphaned adolescents in Uganda (n = 347; ages 10-17; Nyoni, Nabunya, & Ssewamala, 2019) and adolescents living with HIV in South Africa (n = 1,053; ages 10-19; Casale et al., 2019). Therefore, social support from peers, teachers, and caregivers/parents is an essential element in designing effective interventions for adolescents. This is also important because, during this time in life, adolescents seek independence and relationship formation outside their families. The multiple family group intervention provided this opportunity for building social connections within and between families.

Additionally, the study examined the hypothesized direct relationship between exposure to violence and depressive symptoms across patterns of mental health utilization. The results indicate that exposure to violence was associated with an increase in depressive symptoms. This finding is consistent with the literature in this region indicating that there is a high exposure to

violence, especially among adolescent girls (Naker, 2005; Koenig et al., 2003). In the Uganda context, physical discipline is well accepted and can take the form of beating, slapping, caning, and verbal abuse. Yet, considerable evidence suggests that these gender-related inequalities increase vulnerability to depression and stress (Kågesten et al., 2016; Landstedt et al., 2009; Reiss, 2013; Rhodes et al., 2014)

Hypothesis H4c hypothesizing that the indirect effect varies by attendance patterns was also supported because there was no observed indirect effect in low attendants compared to the partially mediated model in the high attendants' group. The intervention likely increased social support. It is also plausible that having more adults and children in the household promotes family cohesion because more adults are available to care for children's needs and provide closeness and comfort as required. This is consistent with the previous finding that family factors including having more adults and children in the family were associated with high attendance in the multiple family group. Furthermore, biological relatedness matters in caregiving relationships, as people prefer to help others who are close to them (Gray & Brogdon, 2017). Indeed, in this study, about 80% of the sample reported both parents living. Therefore, these results add to the growing body of evidence that social support, especially from family members, is a powerful protective factor against negative psychosocial outcomes including depression (Rueger et al., 2008; Rueger, et al., 2016). These findings indicate that, in addition to material support, strategies to improve the support and care for adolescents, especially in low-resource settings, should focus on strengthening family support systems to enhance adolescents' psychological well-being.

6.2 Study limitations

This study has several potential limitations that should be considered when interpreting the results. First, the generalizability of the results is limited due to the use of only a sample of girls engaged in the multiple family group intervention. It is imperative to involve boys in similar studies given that all adolescents living in low-resource settings experience similar vulnerabilities. Similarly, the study was conducted in mostly rural Uganda—a low-resource setting, among school-going adolescent girls in rural settings, which may limit our findings' generalizability. Replication studies with both adolescent girls and boys in urban environments in multiple countries are needed to test if our results are generalizable, and if so, to what extent. Future studies that have the resources to sample both males and females should directly examine their differences in mental health service utilization and treatment-seeking behaviors.

Secondly, our use of a composite measure of perceived social support quality (i.e., a summed score) restricts our ability to differentiate between different forms of support. For instance, the measure assesses the perceived support from peers, teachers, and parents. It is difficult to disentangle which of the forms of support was most useful in alleviating depressive symptoms. Thus, future studies should look at whether the perceived characteristics of different social support sources have different effects on depressive symptoms by using support type-specific measures.

Third, the study failed to detect a significant relationship between patterns of mental health utilization and the theoretically hypothesized factors including predisposing, need, and enabling factors. The lack of a significant relationship may be attributed to the way the intervention was designed including supporting families with transportation. In the same way, the way measures were conceptualized may not be viable given the nature and design of the intervention. For example, location, distance to school, and having resources are key predictors

of mental health use. However, in this study, the intervention was based at the school, which is ideally accessible to many if not all participants. Therefore, location, distance, and resources for transport did not matter in this case. Indeed, the majority of participants lived near their schools within a distance of fewer than 2 kilometers.

Fourth, the study used cross-sectional data to examine mediation models. This poses two challenges, specifically, the inability to make inferences and tests for reciprocal relationships to understand the causality and directionality of the relationships between social support and depression. Given the cross-sectional nature of the data in this study, the potential reciprocal directionality of the relationship between social support and depression cannot be established. There is an evident need for longitudinal analyses in SSA, as researchers need to determine whether social support is an antecedent, mediator, or consequence of mental health functioning— in this case, depressive symptoms. Clarifying the directionality of these relationships is imperative for designing effective social support systems for adolescents in SSA.

Another limitation to this study is that findings were based on self-reported data, which is susceptible to self-reporting bias and common-methods variance issues. Specifically, studies have documented that adolescents and young people possess a wealth of information. Interviewing them, on the other hand, is difficult due to issues such as cognitive and social development (Weber, Miracle & Skehan, 1994) and unequal power relationships, especially among adolescent girls. This was reduced in the current study by using female research assistants who were familiar with the participants, interviewing them in a place that was convenient to them, and using the language, they were most comfortable with.

6.3 Implications for programming and policy

The current study's findings have several implications for programming and policies for adolescent girls, as well as their caregiver families, especially in low-resource settings like Sub-Saharan Africa. First, the study employed task-shifting using community health workers and parent peers to deliver the multiple family group intervention. The intervention specifically targeted family communication, support, and gender equality both within and across families from the same community setting. The study found that participation in the intervention was associated with a significant decline in depressive symptoms. Therefore, the current study argues the existing literature indicating that using task-shifting is critical to reducing the mental health treatment gap among adolescents in Uganda and other SSA countries (Bolton et al., 2007; Nakimuli-Mpungu et al., 2015; Huang et al., 2014).

Moreover, this is important because community health workers, parents, and peers are an integral component of community systems in Uganda including health care facilities and schools hence can be critical partners in advancing access to mental health services in many parts of SSA (Sensy Bahar et al., 2020). Community health care workers, for example, make up a huge part of the primary health care in many parts of SSA in HIV care, malaria, and tuberculosis control (Patel et al., 2016). Additionally, community health workers and parent peers have successfully implemented other mental health interventions in low-resource settings and within SSA (Patel et al., 2016; Singla et al., 2017). For instance, in the SMART Africa scale-up study in Uganda, community health workers and parent peers are facilitating multiple family groups with families and caregivers of children experiencing behavioral difficulties. This is essential for both strategic and sustainable reasons because it addresses the problems of severe mental health human resource shortage.

In the same way, community health workers, and parent peers are accessible and live in communities with the people they serve. Therefore, they provide critical psychosocial care that would otherwise not be accessible to many adolescents in low-resource settings living miles away from formal health care systems. Community health care workers, in particular, are already trained to manage basic physical illnesses and medicines as such, it provides an opportunity for training and guidance that is critical for the successful delivery of evidence-based interventions. Indeed, there are ongoing efforts at equipping community health workers in sub-Saharan Africa with basic knowledge of mental health services so that they can serve as potential service providers (Sensoy Bahar et al., 2020).

Furthermore, it is important to provide training to schoolteachers, nurses, and administrators that interface with adolescents daily to equip them with skills necessary for screening and early identification/detection of mental health disorders. At the policy and program level, the government can provide short-term certificates. Similarly, training institutions in social work and public health can provide advanced degree programs tailored for school professionals with the potential to expand the child and adolescent mental health care workforce. Often, evidence-based mental health interventions rely on highly trained mental health professionals, which are not readily available in low-resource settings characterized by many countries in SSA.

Therefore, the purpose of training lay professionals can be two-fold, including early identification of mental health challenges and delivery of brief, low-cost, and effective evidence-based interventions developed and/or adapted to the Sub-Saharan Africa context. Importantly, the findings point to the need to support and provide ongoing training and supervision to community health workers/lay workers that already exist in the health and education systems. In the current intervention, program at least two program staff attended the sessions and provide

real-time feedback to the facilitators at the end of each session. Therefore, programs designed for adolescents using task-shifting should emphasize supervision and training of the facilitators to ensure intervention fidelity but also minimize any potential harm to adolescents. Previous research has underscored the positive mental health and psychosocial outcomes from interventions delivered by lay workers with little or no prior mental health training (Patel et al., 2015). In the Uganda context, these would include teachers, community health workers, village health teams, and traditional healers as well as parent-teacher association members that work directly with students and families within communities.

Furthermore, the findings also speak to the need to build and strengthen the mental health policy framework in sub-Saharan Africa and Uganda in particular, which explicitly addresses strengthening mental health care needs in non-stigmatizing settings including families, schools, and primary health care clinics. Indeed, development science research indicates that building resilient and responsive community-level systems (schools, families, and health facilities) and targeting harmful environments across the early life course is critical to prevent mental health challenges among adolescents (Aboud & Yousafzi, 2015). This can include building family and parenting intervention at the family level. It can also include teaching emotional regulation skills, promoting a healthy social environment, and increasing access to mental health services at the school level. At the community level, interventions can include providing cash transfers and challenging stigma that affects many adolescent girls and minorities in many communities globally. In Uganda, for instance, schools can be an avenue to provide the skills but also counseling services for many adolescents. Understanding that many adolescents drop out of school, similar programs can be embedded within the community and at public health care centers.

Similarly, it is important to train a cadre of researchers from SSA that can advance mental health services research that is culturally responsive to the local needs of adolescents within the community. In 2008, Patel and colleagues reported that mental health research from Low and Middle-Income Countries contributed 3-6% of all published mental health research. Therefore, it is not surprising that there is limited availability/coverage of evidence-based interventions to address mental health challenges (Singla et al., 2017). Although more than 10 years have passed, I suspect the numbers have improved but not significantly enough across the region with some countries still reporting 4 psychiatrists per 4 million people. Therefore, to change the trend, more robust and evidence-based training is required at both undergraduate and graduate-level courses to provide critical skills necessary for both clinical practice and a productive research career. Pre and post-colonial social work schools in Uganda for example have focused on training graduates for working in the social welfare system. However, there is a need to shift the emphasis on both clinical and research skills.

Several programs are being advanced in the region including SMART Africa (Strengthening Mental Health Research and Training), the Child Mental Health in HIV-impacted Low-Resource Settings in Developing Countries both at Washington University and the London School of Hygiene and Tropical Medicine Program for Mental health in Africa. These are essential steps to provide research capacity and increase research productivity. Notably, more such programs are urgently needed to address the existing gap. Training and empowering local researchers addresses both moral and sustainability imperatives. Local researchers have the local knowledge and understanding of mental illnesses that align with the cultural interpretation of mental illnesses and are more likely to stay within their communities. Therefore, more programs advancing training and capacity building are urgently needed to address the shortage of trainers and mental health professionals.

Additionally, the study examined patterns of mental health service utilization and factors associated with high utilization of mental health services in a community-based setting. This is critical because, given the scarcity of resources in Uganda and the majority of SSA, it is important to examine at what level adolescents get the best use of the services provided. The average attendance was 10 sessions out of 16 sessions. This is consistent with recent reviews indicating that brief-low cost interventions have been most effective in low resource settings (Singla et al., 2017). Furthermore, the study also found that the intervention also improved social support, which in turn, reduced depressive symptoms. As a result, interventions should recognize the interconnection between strengthening families economically, socially, and relationally.

For many low-income households, problem-solving, and social support (which includes relational, physical, instrumental /in-kind, and informational support) have been shown to predict positive outcomes (Orthner, et al., 2004). Due to HIV and other preventable health hazards, many adolescents in SSA and Uganda in particular experience adversity including the death of their parents. Therefore, in the face of adversity such as the death of a parent(s), research indicates that having a close, caring relationship with an important adult –whether a guardian or a supportive non-relative in their social world had a positive influence on the adolescents’ life (Walsh, 2015). Therefore, bringing families together helps to pool together resources necessary to improve the wellbeing of adolescents because families have different strengths and resources, including knowledge, relationships outside of their communities and unique lived experiences.

6.4 Implications for policy and research

The current study was premised on the Andersen behavioral health model of health utilization. This study has one implication for the theory. The model posits that healthcare utilization is a function of three interrelated factors including predisposing, need, and enabling

factors. However, the non-significant results in the regression model indicate that these factors did not hold for adolescents participating in a community-based mental health intervention. This may be due to the characteristics and design of the intervention. First, the intervention was for participants below 18 years, which in many low-resource settings, including Uganda, rely on the decisions of their parents/caregivers. Indeed, adolescents were obligated to attend the intervention sessions with their caregivers/parents. Therefore, it could be that utilization could be heavily affected by the caregiver's decision. This also could potentially explain the finding that having more adult caregivers in the household was associated with high utilization of the intervention.

In the same way, the intervention provided participants with transportation and it was implemented within the community—closer to the adolescents and their families. This arrangement eliminated key barriers to intervention participation. Additionally, the intervention group received multiple component(s) of the intervention including youth development accounts combined with the multiple family group. Although combination interventions are critical to addressing the multidimensional challenges adolescents and their families face, it is not clear which component of the intervention led to high utilization. Therefore, future studies should investigate how specific program features influence and/or restrict participation in the intervention among adolescent girls.

It is necessary to pay more attention to identifying the strengths of families in low-resource settings, especially those who care for and nurture adolescents. This is because adolescents in such households are thriving. However, in the absence of public or community assistance, understanding the mechanisms through which they adapt and cope with the demands and pressures of daily life remain unknown. Adolescents in this study, for instance, reported high social support, which was also associated with a decrease in depressive symptoms. However, the

different sources of support and the reciprocal relationship between depression and social support were not examined. Therefore, this has important implications for future research. To implement contextually relevant effective interventions, future research should examine processes by which poor communities' family resources are built and maintained, necessitating the creation of appropriate and long-term approaches and programming for families and neighborhoods in low-resource settings.

It is also imperative that developing appropriate social support programs for adolescents in SSA will necessitate longitudinal studies. Therefore, future research should examine the reciprocal relationship between social support and depression using data from longitudinal studies. These studies should also involve adolescent boys. Although adolescent girls are more vulnerable in many low-resource settings, the cumulative impact of adversity affects adolescents in general. A review of effective psychological intervention in LMICs by Singla and colleagues (2017) found that there is limited involvement of males in interventions.

Furthermore, future studies might benefit from a mixed-methods approach involving qualitative methodologies. This study used a quantitative approach and therefore some nuances related to mental health utilization of the intervention cannot be established. For instance, about 40 participants did not attend any of the sessions. Quantitative data is limited in helping us understand why they did not attend despite having the same opportunity as other participants. Therefore, qualitative research can help to unravel potential explanations why some participants attend and others do not attend the intervention. In the same way, involving caregivers might be useful to understand factors that encouraged their engagement since this was designed as a family-based intervention. Caregivers are primarily responsible for the care and support of their children and were required to attend the multiple family group sessions with their adolescents. Thus, engaging them in future studies might provide additional information about what they

believe is most effective in supporting not only the social, economic, and psychological wellbeing of their children but also what made it possible or impossible to engage in the intervention.

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